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INTERNATIONAL MERCANTILE MARINE CO.

The annual report of the International Mercantile Marine Co. for the year ended Dec. 31, 1906, will not issue for nearly two months, but it is understood that the showing will be the best ever made by the company.

The company was originally formed under the title of the International Navigation Co. in 1893, which owned and operated the American and the Red Star lines of steamships. In 1902 the name was changed to the International Mercantile Marine Co. and a combination of several of the principal companies engaged in the trans-Atlantic service effected.

The properties acquired included the White Star Line with the business of Ismay, Imrie & Co., agents of the line; the Dominion Line with the business of Richards, Mills & Co., agents of that line; the International Navigation Co., the Atlantic Transport Co., and a majority of the shares of the Leyland Line and the National Line.

The properties were taken over on Dec. 1, 1902, the total tonnage aggregating over 1,000,000 tons. A contract was made with the British government for 20 years according to the terms of which the British vessels belonging to the companies acquired by the new company should remain British, providing a majority of the directors of the English sub-companies, the officers of the ships and a reasonable proportion of the crews shall be British and the ships shall fly the British flag.

The combination has an agreement with the ship building firm of Harland & Wolff, Belfast, Ireland, that all the building and heavy repairs required to be done in a ship yard in the United Kingdom shall be done by them, in return for which they agree not to build any ships for parties not in the combination, excepting only for Hamburg-American Line, so long as orders from

the Mercantile Marine Co., keep their yards busy.

The capitalization of the company is \$120,000,000, equally divided between preferred 6 per cent cumulative and common stock. There is \$51,730,971 preferred and \$49,932,735 common stock outstanding. The bonded debt consists of \$19,897,000 International Navigation first mortgage 5 per cent bonds, \$52,744,000 debenture 4½ per cent bonds and £367,100 Leyland Line debenture 4 per cent.

No dividends have ever been paid on the preferred stock, but the optimistic hopes of the founders is shown by the provision that dividends on the common stock shall be limited to 10 per cent per annum as long as any of the collateral trust 4½ per cent debenture bonds are outstanding.

The operations of the company for the first three years compare as follows, giving gross income, operating expenses and net:

Dec. 31:	Gross.	Oper. Exp.	Net.
1903	\$31,037,420	\$27,036,898	\$ 4,000,522
1904	28,846,993	27,040,586	1,806,407
1905	33,362,918	27,456,174	5,906,744

Total ...\$93,247,331 \$81,533,658 \$11,713,673

The following show fixed charges, profit from the insurance fund and final result for the year:

	Charges.	Ins. Sur.	Surplus.
1903	\$ 3,645,226	\$1,442,502	\$1,797,798
1904	3,845,557	897,052	*1,142,098
1905	3,880,054	864,159	2,890,849

Total ...\$11,370,837 \$3,203,713 \$3,546,549
*Deficit.

The company insures its own ships to a large extent it having been proved that this can be done advantageously and safely with such a large fleet as the company commands.

Shortly after the combination was organized, a profound depression in freight on the North Atlantic set in which continued through the year 1904 and the first nine months of 1905, resulting in losses to all of the lines of the company, and particularly those which relied chiefly on freight traffic for their revenue. Passenger traffic

was very large during that period, but the steamship rate war commenced about that time and passenger rates were absolutely demoralized so that the earnings from that branch, as well as from freight, fell to a low level. This serious condition of affairs in the passenger branch terminated in March 1905, by an agreement among the companies.

The number of steamers now in service, including the subsidiary lines, but exclusive of tugs, lighters, etc., is 129, with a total tonnage of 1,063,269 tons. These are fully maintained, and the cost of maintenance as well as depreciation on all property is charged directly to operating expenses.

THE C. P. R. LAKE BOATS.

Quite a number of steamers are at present being built on the Clyde for service on the great lakes of America, principally for Canadian owners. The Fairfield Co. are making good progress with their two vessels for the Canadian Pacific Railway Co. These are the largest of the lake boats building on the Clyde. They are so large that they can only be taken up through the locks from Montreal in sections, and so they are being built with watertight bulkheads across them aft of the machinery spaces, so that they can be cut in two at the other side and rejoined after reaching the lakes. Messrs. Archd. Mac-Millan & Son, Dumbarton, are building four Canadian steamers; the Grangemouth & Greenock Co., Greenock, one; while a Port Glasgow firm are in the running for a contract for several other lake vessels. All these, however, will be small enough to pass through the locks. They are intended for the grain and general cargo trade.

The Cunard line has announced that the Caronia will run to the Mediterranean again next winter, leaving New York on her first trip on Jan. 4, 1908.

MARITIME ASSOCIATION OF THE PORT OF NEW YORK.

The thirty-fourth annual meeting of the Maritime Association of the Port of New York was held recently in that city. In reviewing the record of achievements for the past year the president, Charles R. Norman, touched upon the following:

The fiscal year was begun with a membership of 941, and closed with a membership of 951 and there were twenty-six applicants who were elected to membership on May 1, bringing the total up to 977, being the first time in twenty-four years that there has been an increase in the membership.

The association has aided all projects tending to the greater commercial activity of the port including the acquirement of docks and ferries, the leasing of the Chelsea docks to the steamship companies at better rates and the important improvement of changing the existing system of assigning berths to vessels; this consisted of consigning berths only to those vessels which were in port and not to those vessels scheduled to arrive as has been the custom heretofore.

The establishment of a weather bureau station at Sandy Hook, which has for some time been agitated by the association is now assured, and the station will no doubt be in operation shortly. Legislation has been sought from congress providing for a light and fog signal at Governor's Island, but while not successful at the recent session it is believed that this will be accomplished at the next session. Congress has already granted an appropriation of \$173,000 to be expended upon the improvement of the Point Judith harbor of refuge, which action has been consistently advocated by the association. They have also advocated the passage by congress of a bill providing for increased compensation for life savers and a suitable pension upon retirement and expect to take an active part in the efforts made to pass the bill at the next session. Other projects in which the association interested itself were the passage of a bill providing for the erection of a monument to the memory of Lieut. Com. George Washington De Long, the bill passed for the licensing of rates of sailing vessels of over seven hundred tons, the adoption of the recording tax bill, and all other projects affecting shipping and the commerce of the country.

The interest taken by the association in the schoolship St. Mary's has enabled it to place all cadets applying to it in positions upon various trans-

Atlantic and coastwise steamships as well as those in the far eastern service and also on sailing vessels. While the effort to secure a new ship to replace the St. Mary's was unsuccessful the steamship Hartford was obtained from the government by the board of education aided by the association.

The membership in their section of the Navy League of the United States has been maintained and should be greatly increased as the members of the association become more familiar with the aims and purposes of the league.

The report of the treasurer, G. B. Lockhart, showed the association to be in good condition financially.

BOSTON TOWBOAT REPORT.

In his report to stockholders President Alfred Winson, of the Boston Towboat Co., says: "The past year's business shows net earnings of \$69,124, from which we have paid 4 per cent dividend of \$50,000 and credited the balance to depreciation and insurance account. The cost of repairs has been \$86,011, charged to operating expenses. Your property is covered by \$1,166,663 insurance. We are glad to be able to say we have made a favorable three years' charter of our three steamers on the Pacific coast for coastwise business. These steamers represent half of our capital stock. This charter goes into effect in May. The last of March we floated steamship Onondaga ashore on Cape Cod for sixty days. We have not settled the compensation yet, but undoubtedly will receive a fair amount."

The income account for the year ended March 31, shows:

	1907.	1906.	1905.
Bal., profit and loss...	\$ 25,000	\$ 25,000	\$13,912
Ins. and depreciation...	50,000	48,704	.....
Net profits	69,123	115,883	72,292
Total	\$114,123	\$189,588	\$86,204
Deduct divs. paid...	50,000	50,000	12,500
Deduct ins. and dep. account	69,123	114,558	48,704
Total deductions....	\$119,123	\$164,588	\$61,204
Bal., profit and loss...	25,000	25,000	25,000

The Puget Sound Tugboat Co., Seattle, Wash., will soon call for bids for the construction of a steel sea-going tug, which will be the largest and most powerful on the Pacific coast. The boat will be equipped with all modern towing appliances and complete wrecking gear. Her dimensions will be: 175 ft. long, 29 ft. 6 in. beam, and 19 ft. 6 in. depth of hold. She will be equipped with two Scotch marine boilers and triple-expansion engines of 1,250 H. P. The boat will be an oil-burner, with tanks allowing of a forty-days' supply.

BIDS FOR SUBMARINES.

Three companies have made bids to the navy department for contracts for supplying as many submarine torpedo-boats as could be built for \$3,000,000, appropriated for the purpose by the last congress. The bids differ so radically in the matter of the size of boats, speed afloat and submerged, radius of action above and below water, and other essentials that it will require much study on the part of the bureau experts to determine which bid is in fact the lowest. On its face the bid of the Lake Torpedo Boat Co., of Bridgeport, Conn., is the lowest one. It proposes to build at Bath, Me., at the yard of the Bath Iron Works, any number of 235-ton boats above five at \$198,000 each. These boats are to be delivered one every three months after the expiration of a period of eighteen months from the date of contract. If the navy department so prefers the Lake Co. is also willing to construct its boats on the Pacific coast or on the Gulf of Mexico. This company submitted four different types of bids, the differences being in the size and price of the boats, the largest being of 500 tons, to cost, in lots of five or more, \$233,000 each, with a maximum surface speed of 15 knots.

The Sub-Surface Boat Co., New York, submitted plans for a boat of 250 tons to cost \$250,000, with a speed of 19 knots and a cruising radius of 2,000 knots. This company has no boat under contest at Newport, but submitted full specifications of one it offers to build at Bath.

The Electric Boat Co., of New York, by whom all the submarines now in the navy were built, submitted bids for two types of boats. The first is patterned after the Octopus, now in the navy—but with a few improvements—of 274 tons and to cost in lots of five or more \$312,000 each. The second type is to be larger, displacing 340 tons, with a greater speed than the Octopus, ranging from eight to thirteen knots, according to the condition of submergence, and to cost, in lots of five or more, \$379,000 each. If the same types are to be built on the Pacific coast they will cost respectively \$340,000 and \$417,000 each.

The Puget Sound Dry Dock Co. has been forced to close down its plant at Quartermaster Harbor owing to a demand for an increase in wages by their workmen, which was so excessive as to amount to almost double the scale the men were receiving. The dock will be closed down indefinitely and only the machine department at Tacoma will be open for business.

ITEMS OF GENERAL INTEREST.

The state of Washington recently presented a handsome silver service to the United States cruiser Washington, now at the League Island navy yard.

After three months' idleness, work has recently been resumed on the dredging of the 30-ft. channel in the Delaware river. The channel will be completed, it is expected, at the close of next year.

The big wooden steamer City of Troy of the Citizens' Line, plying the Hudson from New York to Troy, took fire recently off Yonkers and was reduced to a total wreck in an hour. The passengers were landed while the boat was a mass of flames, no lives being sacrificed.

It is reported that the Czar of Russia and the grand dukes will give \$7,500,000 from their private purses toward the construction of a new fleet of naval vessels. It is contemplated that the tonnage of the improved Russian Dreadnoughts will be increased to 22,800 tons, and it has finally been decided to equip them with turbine engines.

The Fall River liner Providence recently got into difficulty through the parting of her rudder chains while descending the stream at New York and but for the assistance rendered by the fire boat Zophar Mills would have been swept against the rocks on the Manhattan shore. The Mills was somewhat damaged in her effort to save the larger vessel.

The new German armored cruiser, soon to be built, will be of 19,200 tons displacement and will have a speed of 25 knots an hour. She will be fitted with Parsons' turbines and will be the largest vessel of her class afloat. It is also stated that the two new German battleships which are to be built will surpass in size and speed the Japanese leviathans.

It is expected that the Philadelphia & Reading railway will open the south side of its new \$300,000 double-decked pier at Philadelphia for the use of trans-Atlantic steamers, shortly. The new pier is 50 ft. wide and 590 ft. long on the north and 554 ft. on the south side. Both the Cosmopolitan and the Philadelphia Trans-Atlantic lines will discharge there.

Theodore T. Merzerian, inspector of boilers for the port of New York, has brought charges against Henry M. Seeley, inspector of hulls at the same port. It is understood that the question of precedence is the cause. Although the specific nature of the charge is not known, it is probable that it has to do with interference and usurpation of authority, being the outcome of differences of long standing.

The Spanish naval program to be presented at the opening of the Cortes comprises fresh expenditures amounting to \$16,000,000 annually and lasting for several years. The propositions approved by the naval consultative committee include the construction of a defensive squadron, improvement of the coast defenses and the reorganization of the arsenals. It is understood that the total of the appropriations sought amounts to \$64,000,000.

A report is current in England that the largest battleship in the world, having a displacement of 21,000 tons, is to be built in that country for the Japanese. It has been believed that Japan would, in the future, build all her battleships, but it is thought that a vessel of this magnitude would be too great an undertaking for her, and besides this she already has a full quota of work for her home yards. The cost of this new battleship will be about \$11,250,000.

Japan's great war vessel, the Aki, was launched April 15, from the Kure navy yard in the presence of the emperor and other distinguished persons. The Aki is the biggest battleship afloat, having a displacement of 19,800 tons, a length of 492 ft., and a beam of 83½ ft. Her turbine engines will be of 25,000 H. P. and it is estimated that she will have a speed of 21½ knots. The Aki was designed and constructed by the Japanese, the net time of construction being only eight months.

New Orleans is to be favored with improved service to Liverpool shortly. It is the intention of the Leyland line to operate alternately ships from Liverpool to Boston and New Orleans, whereas this service has been almost exclusively conducted with the North Atlantic port heretofore. In this way all the large passenger steamers of the Leyland line will be brought at regular intervals into New Orleans for the improvement of the direct steamship passenger service to England.

The Boston, Cape Cod & New York Canal Co. has announced that the bid of the Cape Cod Construction Co., the only bid received for the construction of the ship canal across Cape Cod, had been accepted, subject to the approval of the joint board of the harbor and land commissioners and the railroad commissioners. The bid was \$11,990,000. The canal, when completed, will be about eight miles long and it is estimated that two and a half years will be required for its construction.

Capt. Hugo Osterhaus has been assigned by the navy department to the command of the battleship Connecticut, succeeding Capt. William M. Swift, who was recently found guilty by court

martial of subjecting his ship to danger. He will be suspended from duty for nine months and will lose three numbers. The Connecticut will remain in Hampton Roads to participate in the naval pageant at the opening of the Jamestown Exposition, after which she will be sent to dry dock for repairs to her bottom, caused by the accident.

Official returns show that there were 1,492 steamships in Japan at the end of December, 1906, displacing 1,034,455.96 tons gross and 654,243.48 tons registered, whereof there was one vessel over 7,000 tons gross, twenty of from 6,000 to 7,000 tons, six 5,000 to 6,000 tons, thirteen of from 4,000 to 5,000 tons, forty-two of from 3,000 to 4,000 tons, 108 of from 2,000 to 3,000 tons and 131 of from 1,000 to 2,000 tons. Sailing vessels numbered 4,044, displacing 346,262.02 tons gross and 324,668.38 tons registered.

The Messageries Fluviales of Strassburg has recently tried an experiment with a newly-invented so-called motor boat or motor canal boat. It is propelled by a specially constructed boiler and engine of 25 H. P., placed at the rear end of the boat. Two specially constructed paddle wheels do the propelling, and automatically rise and fall as the boat is light or laden, thus keeping it the same depth in the water. It is claimed that this is the first canal boat on the German canals which is propelled with other than the usual horsepower.

There are decided prospects of a steamship war between the German lines and the Cunard company according to the latest advices from the Continent. It seems that the Hungarian government is anxious to annul the contract it has with the Cunard line for controlling the emigration traffic from that country and enter into an agreement with the Continental companies under the leadership of the North German Lloyd. It is expected that the Cunard will retaliate by inaugurating a rate war on the Continental companies, but they are fully prepared, owing to their contract with the Morgan interests. There has recently been formed a combine between the North German line, the German Levant line and the Hungarian Levant lines for the control of the trade with the eastern Mediterranean, which has been granted a subsidy by the Hungarian government to the extent of fifty thousand per annum. While report has it that the Cunard is to retire from the Adriatic, the representatives of the company in this country say that there is no impending departure of the Cunard line from that field.

SHIP YARD NEWS.

Work on the new wharf for the Alaska Steamship Co. at Victoria, B. C., has been begun by the British Columbia General Contract Co.

Capt. Weston of Olympia, Wash., has awarded contract for a tug to Crawford & Reed of Tacoma. The tug will be 65 ft. long and will have a Taylor boiler. Her engine will be built by Seattle parties.

James Reese & Sons Co., Pittsburg, have recently completed the steamboat Clara Ramos, one of five built by them for service out of Frontera, Mexico. She is now on her way to that port.

The Benedict-Manson Co., New Haven, Conn., has given contract to the New England Co., Bath, Me., for the construction of a four-masted wooden schooner for use in the coasting trade.

The old wooden dry dock at the navy yard at Kittery, Me., was sold at auction recently, bringing \$35,291. The lowest bid was \$800. The original cost of the dock, in 1851, was \$437,325.

The Clyde line steamer Onondaga, which was ashore at Chatham Beach, Mass., for about two months, is at the yard of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, for repairs.

The six-masted schooner which Percy & Small, Bath, Me., are to build to the order of J. S. Winslow & Co., of Portland, Me., is to be the largest one afloat. Construction will soon be started on this immense vessel.

The steamer Charles Macalester, of the Mt. Vernon and Marshall Hall route has been in Baltimore for some time, being fitted with new boilers and undergoing other repairs. She will return to Washington shortly.

The Moran Bros. Co., Seattle, Wash., recently laid the keel of the steel freighter it is to build for the Alaska Pacific Steamship Co., which will be 225 ft. long, 41 ft. beam, and 10 ft. depth of hold, and which will cost \$200,000.

The Portland Co., Portland, Me., is building a steamer 90 ft. long and 20 ft. wide for the Winter Harbor Transportation Co., to take the place of the Ruth, on the Bar Harbor and Winter Harbor route. She will be named the Schoodic.

The Newport News Shipbuilding & Dry Dock Co. is to build a 540-ft. passenger and cargo steamer for the Matson Navigation Co., to ply between San Francisco and the Hawaiian Islands. The vessel will cost about \$700,000.

The ship yard formerly conducted by E. & I. K. Stetson at Bangor, Me., has

APPOINTMENTS OF MASTERS AND ENGINEERS.

	CAPTAIN.	ENGINEER.
Sch. Ontario	F. GRANVILLE, SOUTHAMPTON, ONT. Frank Granville	
Str. Lizzie Madden	M. J. LYNN, MGR., BAY CITY, MICH. Ralph Pringle	William Doran
Bge. Theo. Wall	A. Haganev	
McGregor	A. Bigger	
Sch. Cataract	F. MCGIBBON, SARNIA, ONT. W. Sutherland	
" Corisande	D. Sutherland	
Sch. Oliver Mowat	JOHN MCLILLAN, BOWMANVILLE, ONT. G. W. Robertson	
Str. M. M. & N. No. 1	MANISTIQUE & NORTHERN RY. CO., MANISTIQUE, MICH. W. P. Robertson	J. Taylor
Str. Midland Prince	MIDLAND NAVIGATION CO., MIDLAND, ONT. W. H. Featherstonbaugh	Ed Abbey
" Midland King	Frank Burke	George Smith
" Midland Queen	James Tindall	Frank Goodwin
Str. Traveler	MIDLAND WRECKING & TOWING CO., MIDLAND, ONT. Roy Burke	James McGregor
" Magnolia	J. B. Clark	John Kinnel
" Reliance	A. B. Cuff	Thomas Muiray
" Metamora	Ed Burke	John Smith
Sch. Arthur	ELIAS ROGERS CO., TORONTO, ONT. Charles I. Wakeley	
" Keewatin	James Cornwall	
Sch. St. Louis	SYLVESTER BROS., TORONTO, CAN. George Williamson	
Str. John Roberts	MILWAUKEE SAND & GRAVEL CO., MILWAUKEE, WIS. A. Warrender	Jerry Haverlick
" Ellen	M. Dailey	Jul. Schroeder
Str. Empress	OTTAWA RIVER NAV. CO., MONTREAL, CAN. E. Elliott	H. Charland
" Victoria	J. C. Barclay	Noe Chartier
" Duchess of York	E. P. Shepherd	Narcisse Marchand
" Princess	W. F. Halen	Ferd Riche
Sch. Buffalo	LOUISE A. PEDERSON, BUFFALO, N. Y. K. Pederson	
Str. Bluebell	TORONTO FERRY CO., TORONTO, ONT. R. William	J. W. Aston
" Primrose	T. Jennings	J. S. Adams
" Mayflower	G. Moulton	J. Urquhart
" Shamrock	W. Foster	J. Lawrence
" Island Queen	J. Tymon	H. Dawson
" Kathleen	M. Osborne	J. G. McKim
" Clark Bros.	H. McSherry	J. Currin
" John Hanlan	W. Joyce	S. Whitty
" Ada Alice	J. McDonald	J. Thompson
" Luella	W. Murphy	J. Smiley
Str. Boston	THE WESTERN TRANSIT CO., BUFFALO, N. Y. H. L. Dennis	Philip J. Rahal
" Buffalo	John Fisher	James Sangers
" Chicago	Thomas Slattery	John Rainey
" Commodore	James R. Gibson	John Metke
" Duluth	S. R. Jones	Frank Miller
" Milwaukee	F. D. Osborne	Daniel Donohue
" Mohawk	H. Murphy	Charles L. Murray
" Superior	Donald Gillies	John W. Mark
" Syracuse	John Kennedy	Albert Scott
" Troy	Robert Murray	Fred Hale
" Utica	John Davis	Patrick Welch
Str. L. C. Smith	U. S. TRANSPORTATION CO., CLEVELAND, O. E. T. Rattray	
" Hurlbut W. Smith	H. L. Mills	
" William Nottingham	William H. Blattner	
" George B. Leonard	George W. Pierce	
" Monroe C. Smith	C. D. Woodward	
" B. Lyman Smith	Sidney Le Beau	
" Wilbert L. Smith	F. H. Reid	
" Horace S. Wilkinson	A. W. Stalkes	
" Charles M. Warner	Frank C. Folsom	
" W. W. Brown	Wesley Rinn	
" A. G. Brower	E. A. Hill	
" Emma E. Thompson	W. N. KELLEY, M. O., TRAVERSE CITY, MICH. Martin Peterson	John Hatton
Str. Maine	S. C. MCLOUTH, MARINE CITY, MICH. William Booth	Henry Minnie
" Sydney C. McLouth	William Shorkey	John Lietch
Bge. F. M. Knapp	John Booth	
" Uranus	George Shaw	
" Emma E. Tyson	J. N. Garlock	
Str. Cataract	MYLES TRANSIT CO., HAMILTON, ONT. Leon Brigent	Peter Ryan
Str. Monohansett	OHIO COOPERAGE TRANSPORTATION CO., CLEVELAND, O. J. R. Inches	

APPOINTMENTS OF MASTERS AND ENGINEERS.

	CAPTAIN.	ENGINEER.
Str. Helen C.	SMITH'S DREDGE & TUG LINE, MANISTEE, MICH. Peter Young	Henry Bruton
Str. Turbinia	TURPINE STEAMSHIP CO., HAMILTON, ONT. A. W. Crawford	James Smeaton
Str. John B. Cowle	COWLE TRANSIT CO., CLEVELAND, O. C. Z. Montague	
Str. Charles Hubbard	L. C. SMITH TRANSIT CO., CLEVELAND, O. Frank Boyer	
" Harry Coulby	J. H. Driscoll	
" Lyman C. Smith	Alex Forbes	
" Now building	R. J. Lyons	
" Maryland	VANCE & JOYS, MGRS., MILWAUKEE, WIS. Tim Kelley	M. Conley
" Manchester	E. Zwemer	James Grant
" Ferd Schlesinger	E. H. Brownell	C. W. Moderson
" F. L. Vance	D. L. Vail	Case Ball
" R. P. Flower	William Rosie	George Rish
Str. Fred Pabst	WEST DIVISION STEAMSHIP CO., D. SULLIVAN, MGR., CHICAGO, ILL. John F. Hutton	James Rossan
" W. H. Wolf	Edward Fitch	William J. McSweeney
Str. E. J. Earling	FRANKLIN STEAMSHIP CO., D. SULLIVAN, MGR., CHICAGO, ILL. D. C. Sullivan	Richard Piepkorn
Str. James S. Dunham	CHICAGO NAVIGATION CO., D. SULLIVAN, MGR., CHICAGO, ILL. Frank C. Pratt	E. B. Purvis
" W. E. Fitzgerald	A. C. Callam	Theo A. Myers
Str. A. B. Wolvin	ACME STEAMSHIP CO., A. B. WOLVIN, MGR., DULUTH, MINN. Alex Craigie	George A. Gardner
" James C. Wallace	J. W. Ehrhart	Andrew Haas
" Ward Ames	Frank C. Rae	James Patterson
Str. D. G. Kerr	PROVIDENT STEAMSHIP CO., A. B. WOLVIN, MGR., DULUTH, MINN. E. D. Ballentine	W. A. Moudy
" James H. Reed	F. P. Houghton	J. A. McPhee
" D. M. Clemson	S. R. Chamberlain	J. A. Popp
" James H. Hoyt	L. J. Tilden	J. J. McCoy
Str. George W. Peavey	PEAVEY STEAMSHIP CO., A. B. WOLVIN, MGR., DULUTH, MINN. L. E. Boyce	A. L. Roberts
" Frank H. Peavey	John A. Duncanson	M. Madsen
" Frank T. Heffelfinger	John Tower	W. L. Sperry
" Frederick B. Wells	W. A. McLeod	William A. Lewis
Str. H. D. Coffinberry	EUGENE M. CARLETON, CLEVELAND, O. George Forrest	George Masters
Str. Kensington	JOHN J. BOLAND & CO., BUFFALO, N. Y. John O'Hagen	John J. Darcy
" Yale	M. Christy	Frank Harringer
" Winnipeg	W. M. Brooks	J. Mallen
" John Pridgeon	Hugh O'Hagen	W. Scott
Bge. J. I. Case	Charles Keenan	
Str. John Crerar	GREAT LAKES & ST. LAWRENCE TRANS. CO., CHICAGO, ILL. Harry Hutchins	John Bustead
" H. G. Dalton	Joseph Rinn	Guy Barnhart
" A. D. Davidson	B. J. Alban	William W. Norcross
" George C. Howe	George E. Talbot	Charles Bendschneider
" S. N. Parent	Frank H. Johnson	C. T. Kidd
" J. S. Keefe	Dan Barry	George Winters
" John Lambert	D. T. Sullivan	John McCaffery
" John Sharples	F. L. Meno	William Furey
" A. M. Marshall	F. B. Greenway	Allan W. Scott
" Robert Wallace	Ralph Gleason	George E. Williard
Str. William Henry Mack	JENKINS STEAMSHIP CO., CLEVELAND, O. James Doner	William Constable
" F. B. Squire	George Stevenson	
Str. James P. Walsh	C. O. JENKINS, MGR., OHIO STEAMSHIP CO., CLEVELAND, O. A. J. Greenley	William H. Kennedy
" Sir Thos. Shaughnessy	Ralph E. Byrns	A. P. Stewart
New Steamer	William Smith	Wallace Tomey
Str. George C. Markham	WILLIAM MUNROE, M. O., MUSKEGON, MICH. Anton Christenson	Ambrose Smith
Sch. Lyman M. Davis	Hans Hermanson	
Str. Missouri	NORTHERN MICHIGAN TRANSPORTATION CO., CHICAGO, ILL. William Finucan	Thomas Collins
" Illinois	John Staffelbeam	E. Wiederhoff
" Kansas	C. A. Small	
Str. Robert Mills	RED STAR LINE, BUFFALO, N. Y. C. F. Miller	Robert D. Fisher
Str. F. R. Buell	TONAWANDA BARGE LINE, CHAS. WESTON, M. O., N. TONAWANDA, N. Y. C. W. Woodgrift	Thomas Phillips
" A. Weston	D. McKenzie	William Carrick
Bge. A. Stewart	Gilbert Forton	
" Eleanor	Fred Chamberlin	

been taken over by a company to be known as the Marine Railway & Lumber Co. The company will make a specialty of repairing vessels and will deal also in southern pine lumber.

The Marine Railway Co., Sharptown, Md., recently launched the gasoline-propelled oyster-boat Thomas J. Saurhoff. The vessel is 85 ft. in length and is equipped with three gasoline engines of 25-H. P. each. She will have a speed of 25 knots.

The Bowker ship yard at Phippsburg, Me., will build two more schooners as soon as the one now under construction is completed. The next vessel to be constructed will probably be a schooner of about 600 tons, for the lumber trade.

The Newport News Shipbuilding & Dry Dock Co. recently completed the refitting of the steamer Newport News, of the Washington & Norfolk line. Twenty-six new staterooms have been added, increasing the sleeping accommodations to that extent.

The scout cruisers Birmingham and Salem will be launched from the yard of the Fore River Ship Building Co. shortly, the dates being May 29 and June 12, respectively. The Salem has turbine engines and the Birmingham has reciprocating ones.

The ferry boat Maryland was launched recently at the yard of the Maryland Steel Co. The vessel, which is for the New York, Philadelphia & Norfolk railway, is 250 ft. long, 40 ft. beam and 15 ft. deep. She will have a speed of about 17 miles an hour.

The British Columbia Marine Railway-Co. proposes to erect a marine railway at New Westminster which will be 600 ft. long, capable of docking vessels 250 ft. long, and with a cradle 35 ft. wide. The company is also considering the construction of a dry dock at Victoria, B. C., capable of accommodating large ocean-going vessels.

The Kelley-Spear Co., Bath, Me., are about to build a sister barge to the one now under construction at their yard for the Bay Shore Lumber Co. and which is about ready to go overboard. These barges are 160 ft. long, 36 ft. beam and 12 ft. deep and are designed for carrying pulp-wood between Nova Scotia and Kennebec, Me.

The steamer A. W. Perry, of the Plant line steamers, plying between Boston and Halifax, is having extensive alterations made at Philadelphia, which will increase her stateroom capacity. The steamer Halifax is running in her place while the repairs are being made. During the winter the Halifax ran between Key West and Havana.

The steamer *Kenosha* is at the Roach yard, Chester, Pa., for repairs to her machinery.

Harlan & Hollingsworth, Wilmington, Del., recently delivered the light-house tender *Sunflower* to the government.

J. S. Winslow & Co., Portland, Me., have awarded contract to Percy & Small, Bath, Me., for a 300-ft. 6-mast schooner.

Arthur D. Story, Essex, Mass., is building two 80-ton schooners for stock, one of which is ready to be launched.

The Merchants' & Miners' liner *Powhatan* will undergo a general overhauling at the Newport News Co.'s yard.

The steamer *Pioneer* of the Stephens & Condit line was damaged by fire to the extent of \$75,000 recently while lying at her dock in the North river, New York.

The Gilbert Transportation Co. is having the schooner *J. W. Balano*, 163 ft. long, rebuilt at Mystic, Conn. Her name will be changed to *Gracebelle Taylor*.

The Deibert Bros. Co., Elkton, Md., have recently completed two barges, one for the James J. McNally Co., Philadelphia, and the other for Capt. A. Johnson, Norfolk, Va.

The Southern Pacific is to increase its San Francisco bay fleet by the addition of a large steel fire tug, a ferry steamer for teams, a big Sacramento river boat and a new bay passenger ferry.

The J. M. Guffy Co. has awarded a contract to the New York Shipbuilding Co. for the construction of a 440-ft. steamer with a capacity of 50,000 barrels of crude oil in bulk, which will run between Texas and eastern ports.

Fire Commissioner Lantry, of New York city, has placed a contract with Alexander Miller & Bro., for a fireboat to cost \$97,800. This is the third fireboat built by this company for the city of New York.

The Union Iron Works, San Francisco, recently launched the steamship *Columbian* for the Mexican-Hawaiian line. She is 473 ft. long, 57 ft. beam and 27 ft. draught loaded. She is to attain a speed of 12½ knots.

The New England Navigation Co. has awarded contract to the Fore River Shipbuilding Co., Quincy, Mass., for a steel derrick lighter for use in Boston harbor. The lighter will be 130 ft. in length, 30 ft. beam and 13 ft. deep.

The New Orleans dock board has recently launched the dredge boat *Vulcan*, which was built entirely by the dock board forces. She will be fitted with the machinery of the old dredge

boat *C. K. Burdeau*, which will be superseded by the new boat.

The Willamette Iron & Steel Works, Portland, Ore., are building the machinery for the new steam schooner *J. Marhoffer*, which was built at Lindstrom's yard, Aberdeen, Wash., for the Olson, Mahoney Co., San Francisco, Cal.

The new steamer *Tourist*, which was launched recently from Carlson's yard at Port Blakeley, Wash., will succeed the *Port Orchard* on its Seattle-Port Orchard run. The engines of the *Port Orchard* will be installed in the new boat, which is a stern-wheeler.

The fifth lighthouse district has awarded contract to the Chesapeake Marine Railway Co. for repairing the lighthouse tender *Maple* at a cost of \$5,000; the *Diamond Shoals* lightship No. 71 will be repaired by McIntyre & Henderson at a cost of \$1,135.

The Kelley-Spear Co., Bath, Me., has under construction a large barge for C. M. Cole, Fall River, Mass., to be launched soon, three covered lighters for the Jay Street Terminal Co., New York city, one of which is nearly ready for launching, beside five other hulls.

The Fore River Shipbuilding Co., Quincy, Mass., recently launched the *Holland* submarines, *Viper* and *Tarantula*, the second and third of four now building for the navy. Should any accident occur to the machinery of these boats while submerged they would at once rise to the surface, as their weight is less than that of the water displaced.

The American-Hawaiian Co.'s business has increased to such an extent, since the opening of the Tehuantepec route, that it has placed orders for three new steamers with the Union Iron Works, San Francisco, and they are now under construction. Being unable to wait for the completion of these vessels, the company has purchased the freighters *Maine* and *Missouri* from the Atlantic Transport Co. These are twin vessels of 5,077 net tons each.

The steamer *Bunker Hill*, building for the New England Navigation Co., by the William Cramp & Sons Ship & Engine Building Co., Philadelphia, was launched recently. She is for the new outside line between New York and Boston. The steamer is 375 ft. in length on the waterline, 396 ft. over all, 52 ft. molded breadth and 22 ft. molded depth. She is to have twin screws, driven by two four-cylinder triple-expansion engines, size 26, 43, 51 and 51 in., by 42-in. stroke, steam to be supplied by eight 14-ft. 9-in. by 11-ft. Scotch boilers.

R. Palmer & Son, Noank, Conn., now have nine vessels on the stocks at their yard, and as soon as a tug build-

ing for McAllister Bros., New York, which is now nearly ready for launching, goes overboard the vacant berth will be occupied by another keel.

The Lindstrom Shipbuilding Co. has five steam schooners on the stocks at its yard at Eureka, Cal., and three at its yard at Aberdeen, Wash. Those at the Eureka yard include two for the Charles McCormick Co., one for Matthew Turner and one for Beadle Bros. of San Francisco, and one for the Holmes Eureka Lumber Co., Eureka, Cal. They will cost about \$80,000 each.

The Sloan Yards at Seattle, Wash., are accomplishing an unusual feat in that they are constructing the whole forward end of a boat which is to be shipped to Alaska and placed on a steamer. The vessel to which this is to be done is a stern-wheeler, recently purchased by Capt. Langley on the Yukon river, and which had a scow bow. This will be cut off and the knock-down bow which the Sloan Yard is building will be taken up and put on.

The Harlan & Hollingsworth Corp., Wilmington, Del., recently launched the steel screw ferry boat *Bay Ridge*, building for the city of New York. This vessel, which is the first of three which are under construction at this yard, is 209 ft. long, 45 ft. beam, and 16.7 ft. depth of hold. There are two coupled compound engines, each with cylinders 18 and 38 by 28 in., and four boilers, size 11 by 10½ ft. The three boats were designed by J. W. Millard, New York.

Pusey & Jones, Wilmington, Del., will shortly launch two steel tugs building for the quartermasters' department. They are duplicates of the *Albert G. Forse*, recently launched, and will be named *Capt. G. W. Morrison* and *Capt. Charles W. Rowell*, and will be used for harbor work. The tugs are 86 ft. long, 20 ft. beam and 10 ft. 10 in. deep. Each has twin screws, driven by engines with cylinders 7.5 and 15 by 14 in., steam being supplied by one Scotch boiler, 10½ by 11½ ft.

The Hammond Lumber Co., San Francisco, Cal., in conjunction with the C. A. Smith Lumber Co., Minneapolis, Minn., has let contract for two new steamers for Pacific coast lumber carrying service. They are to be built at Newport News, Va., and will be 276 ft. in length and 42 ft. beam, with a draught of 20 ft. The engines are to be of 1,500-H. P. The steamers will carry 2,250,000 ft. of lumber each. The Hammond Lumber Co. also has a tug under construction by Neafie & Levy, Philadelphia, which will be 140 ft. long with engines of 900-H. P. The tug will be an oil burner.

COMMERCE OF SAULT STE. MARIE CANAL.

The report of the superintendent of the Sault Ste. Marie canal shows that 1,078,613 tons of freight were moved through the canal during April as against 2,513,267 tons last year or a decrease of 1,434,654 tons. It will not be difficult, however, for the fleet to overcome this handicap. Following is the detailed report:

EAST BOUND.			
Articles.	U. S. Canal. Opened April 23.	Canadian Canal. Opened April 22.	Total.
Copper, net tons	585	.....	585
Grain, bushels	618,000	291,500	909,500
Building stone, net tons .....	.....	.....	.....
Flour, barrels	93,386	.....	93,386
Iron ore, net tons	191,780	12,880	204,660
Iron, pig, net tons .....	.....	.....	.....
Lumber, M. ft. B. M.	312	.....	312
Silver ore, net tons .....	.....	.....	.....
Wheat, bushels	2,867,841	276,495	3,144,336
General merchandise, net tons	37	.....	37
Passengers, number	3	.....	3
WEST BOUND.			
Coal, hard, net tons	111,548	39,333	150,881
Coal, soft, net tons	379,605	172,832	552,437
Flour, barrels .....	.....	.....	.....
Grain, bushels .....	.....	.....	.....
Manufactured iron, net tons	5,006	4,419	9,425
Salt, barrels	33,780	.....	33,780
General merchandise, net tons	10,162	19,952	30,113
Passengers, number	56	6	62
Freight:			
East bound, net tons	304,659	26,031	330,690
West bound, net tons	511,388	236,535	747,923
Total freight, net tons	816,047	262,566	1,078,613
Vessel passages, number	278	146	424
Registered tonnage, net tons	571,274	381,111	952,385

COURT DECISIONS.

DUTY TO VISITORS ON BOARD SHIP.—A steamship on a voyage from Alaska to Seattle in October stopped at an Alaskan port in the night, and a minister residing there with his family, without objection on the part of the officers, went on board to see a passenger. The signal for starting was given, but, before the visitor reached the gangplank, it had been taken in, and the master, when appealed to, refused to put libellant ashore, and carried him to Seattle. The court held that, under the circumstances, and in view of the serious inconvenience and loss which would necessarily result to the visitor from taking him such distance without preparation or the knowledge of his family, it was the duty of the master to afford him an opportunity to go ashore, even if, as claimed, the vessel had already swung from the wharf before the master had knowledge of the situation, and a relanding would have been necessary; and that the vessel was liable in damages.

The court holds that it is the duty of the master of a vessel, by whose permission, or at whose implied invitation, a visitor has come on board at a port, to exercise reasonable care to avoid injury to such visitor, and to give him a reasonable opportunity to go on shore be-

fore the vessel departs; the measure of such duty being affected by the magnitude of the injury which will otherwise result to the visitor.

LIABILITY OF VESSELS FOR INJURIES CAUSED BY COLLISION.—The owners of a vessel which, through the fault or negligence of any one on board, injures another vessel by colliding with her, are liable to the injured party, although

tention. As said in a case before the federal courts, "Where repairs are practicable, the general rule followed by the admiralty courts in such cases is, that the damages assessed against the respondent shall be sufficient to restore the injured vessel to the condition in which she was at the time the collision occurred; and in respect to the materials for repairs the rule is that there shall not, as in insurance cases, be any deduction for the new materials furnished in the place of the old, because the claim of the injured party arises by reason of the wrongful act of the party by whom the damage was occasioned, and the measure of indemnification is not limited by any contract, but is co-extensive with the amount of the damages."

In general, the rule in reference to the measure of damages for the cargo is its value at the port of shipment, and all expenses of lading it on board and transporting it to the place where the collision occurs. Expenses incurred in raising the wreck of a vessel sunk by collision, to the extent necessary to ascertain the fact that she could not be repaired, are recoverable in addition to her value.

Where a collision between two vessels results from the fault of both, a person who sustains injury from such collision may recover damages against both of them. He may proceed against both in the same libel, and the damages will be apportioned between them by the decree, and if either be unable to respond in damages, he may compel full payment from the other.

(Concluded.)

BRITISH BATTLESHIPS.

The building of more British battleships during the coming year is in some measure dependent upon the outcome of the Peace Conference at the Hague.

Lord Tweedmouth, first lord of the admiralty, said recently, in speaking of the matter: "The new construction, estimated at \$40,500,000, against \$46,175,000 for 1906-7, will include two, or unless an understanding between the naval powers is reached at the Hague conference, three large armored vessels of the Dreadnought type."

One fast unarmored cruiser, five torpedo boat destroyers, twelve torpedo boats and twelve submarines are also provided for. On April 1 there were under construction five battleships, seven armored cruisers, eight torpedo boat destroyers, seventeen torpedo boats and twelve submarines. The estimates for the year show a total reduction of a thousand men and \$5,675,000, compared to 1906-7.



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AUSTRALIAN SERVICE ABANDONED.

The new service inaugurated six years ago between San Francisco and New Zealand with the three Cramp built steamers Ventura, Sanoma and Sierra by the Oceanic Steamship Co., and which at that time was fervently welcomed by all of Australia, has now been permanently abandoned. The company found it impossible to operate the service south of Hawaii upon the niggardly sum allowed for mail carriage by the United States government. While a fair commercial business existed it was not sufficient in itself to be profitable. It seemed quite clear too that the three weeks schedule could not be successfully maintained by three steamers, it being necessary to put a steamer out of commission occasionally for repairs. A fourth steamer was needed on the route, but could not be maintained without ad-

ditional aid from the general government. Owing to the irregularity in delivery of mails the New Zealand government withdrew its subsidy last November. The inevitable result was the abandonment of the route. The American merchant marine seems to be disappearing from the Pacific altogether.

OPTIONS ON BERTHS.

With furnaces roaring for food, with only 1,930,000 tons left on Lake Erie docks at the opening of navigation, with the April movement of ore over 800,000 tons less than it was a year ago, with further delays inseparable from the congestion of the coal laden fleet at upper lake ports, coupled with the necessity of a movement of 4,000,000 tons in excess of the record-breaking movement of 38,000,000 tons last year, the season of 1907 on the great lakes must be the most strenuous in its history. To accomplish it every part of the wonderful mechanism will have to move with clock-like regularity. The storage capacity of the docks is insignificant in comparison with the quantity which must actually be shipped, and therefore boats must be waiting under the chutes to receive the ore as it is actually dumped from the cars into the ore pockets. It can rest in the ore pockets but a little while, if at all.

The season is easily a week behind, if not more, a sensible percentage in a season that is never very long. All things point to a strenuousness of movement that cannot be met with elsewhere in the world, and which will tax mechanical ingenuity to the utmost. There is a great demand for carriers of all kinds, and an especially eager demand for small carriers which cannot be met at all. There are not enough of the smaller class of vessels on the lakes to do the business that is naturally allotted to them. Small as this fleet is, it has been depleted by numerous purchases during the present year by coastwise interests. Leading interests that have desirable steamers of the smaller class have declined to part with them, even at advantageous prices, considering investment, because they have need of them.

It is therefore a pertinent inquiry as to whether it would not be good business

to secure options on berths for ships for 1908 delivery. It is reported, though not confirmed, that two such orders have been placed. This would appear to be good business policy. As far as signs go there will be no let-up in consumption during 1908. Neither material nor labor will be lower next year. Material cannot be since those who are now trying to fill their pig iron requirements for the last quarter of the present year have discovered that they cannot do so without paying an advance of from one to three dollars per ton. Wages, on the eve of a presidential election will certainly not be reduced. The advantage must therefore be to the man who places his orders early with the shipyards, because he certainly cannot lose anything by so doing, but on the contrary gains time, which is the large element in lake trade.

The vessel business of the great lakes is as sound and reliable as the railroad business, with the added advantage of greater profit since there are no charges for maintenance of highway, that being the gift of nature assisted by the federal government. The business is certain since the commodity which it deals with cannot be moved in any other way. Were the lakes to be dried up tomorrow morning their commerce would not be transferred to the railroads. It would simply cease to exist. True, there are elemental hazards, but these work no financial hardship since they are distributed among the insurance companies. The business, indeed, has many advantages. It is free from detail and is practically upon a cash basis. It is an integral part of the great iron business of the United States which can never be dispensed with so long as the United States maintains its supremacy among the steel-making nations. That supremacy cannot be disputed for half a century at least.

The season of 1907 opens on the lakes with every vessel owner having on his books all the contract ore that he cares to deliver, and with shippers urging him to take more. Naturally he is wary about taking more because the logical situation would seem to indicate that he can get a better rate as fall approaches. Already a smart premium is being paid on coal cargoes.

BREAKING THE ICE BLOCKADE.

Fort William, May 8.—Since the tug James Whalen, belonging to the fleet of the Canadian Towing & Wrecking Co., Fort William, Ont., went into commission on April 10 she has made quite a record for herself. She broke a passage across the bay through ice 30 in. thick in order to enable the steamers Minch and Bixby to reach the Empire elevator to load. The ice at Fort William and Port Arthur was so thick this spring that it became clear that it would have to be artificially broken if the twin ports were to be open for navigation simultaneously with other lake ports. The Whalen was put to work on April 12 breaking a channel. The ice was found to range in thickness from 24 to 36 in. Operations were aided by the use of dynamite, particularly where heavy windrowed ice was encountered. The course of the channel was laid slightly to the westward of Silver Islet. Very heavy ice was encountered about a half mile beyond Silver Islet, extending about twenty-eight miles, all solid blue ice.

The fleets of ships from the Sault passed through a ten-mile float of ice on their course to Thunder cape. About three miles to the west of Shangoinah there was met the heavy solid ice, and not having been advised of the progress of the Whalen masters were rather at a loss as to how to proceed. On Sunday, April 28, some of the masters distinguished the tug working down in the vicinity of Silver Islet. At 3 p. m. of the same day the tug reached the fleet and stood by until Monday morning, piloting the fleet into the harbor, widening the channel for the accommodation of the larger vessels. The fleet were in order named:

Midland Prince, light, Capt. Featherstonebaugh.

Martin Mullen, coal, Capt. Charles Benham.

Harry Coulby, coal, Capt. James Driscoll.

Matthew Andrews, coal, Capt. Joseph Lampoh.

H. B. Hawgood, coal, Capt. Arthur May.

Saturn, coal, Capt. Landgraft.

Midland Queen, light, Capt. Tyndall.

The relief effected to the Canadian Northwest thereby was considerable, as there was a scarcity of coal and great accumulation of grain awaiting transit eastward.

Captain Joseph Lampoh of the Andrews and Capt. Charles A. Benham of the Martin Mullen congratulated the owners of the Whalen upon her performance. The board of trade also adopted a resolution of thanks to the department of marine and fisheries for engaging the Whalen to break the ice blockade. Capt. Benham's letter was as follows:

"Kindly allow me to congratulate you upon the most excellent work performed by your tug and ice-crusher James Whalen. I have been in all the ice blockades upon the several lakes this spring and have personally seen the different boats at work breaking ice, and I can say without any prejudice that the Whalen is without an equal. When we reached the edge of the solid ice about seven miles east-south-east of Thunder cape, I concluded it would be from two to three weeks before we could possibly get to Fort William, the ice being perfectly clear and solid and of twenty-eight inches in thickness. What was our surprise, however, when at dark that same night the Whalen arrived out alongside of us and informed us that we could start at daybreak the next morning, arriving in Fort William at 6 p. m. the same day, April 29th. I do not think that this performance has ever been equalled, and again I wish to congratulate you upon it."

FREIGHT SITUATION.

Ore shipments during April were 630,975 tons, as against 1,447,386 tons during April, 1905, a decrease of 816,411 tons. Of course, the weather is responsible for this shortage, the receiving ports having been blocked by ice. Shipments were seriously delayed by frozen ore and by the bunching of carriers at the docks. In fact, this feature is not altogether straightened out yet, and it will probably be a week yet before things are moving smoothly. The tardiness of the movement has caused some of the leading shippers to grow apprehensive over their requirements and they have latterly been in the market seeking additional vessel tonnage. Big blocks of ore have been covered during the week at contract rates, but some vessel owners have declined to take further contract ore, believing that the wild rate will work out to their advantage later on. However, while more ore will be moved wild this year than last it is no longer a really important movement. So abundant is the patronage of the ore shippers, season in and season out, that leading vessel interests naturally cater to them even when better rates might be obtained on single cargoes later.

The figures of ore on Lake Erie docks May 1 cannot be published this week owing to the fact that ore dock is lacking. However, it may be stated that minus this dock the figures show that 1,930,088 tons remained on dock May 1 as against 1,791,090 tons May 1 last year.

The congestion of carriers at upper lake ports has, of course, had its influence at the lower lake terminals, especially in the movement of coal. The vessels were not getting around as fast as the railways were hauling coal to Lake

Erie ports, with the result that the railways ceased shipping. This in its turn has resulted in car shortage in the ore trade. Naturally all ore coming down at present is for direct shipment to furnaces, and the failure of the railways to have cars on hand makes an extra handling of this ore necessary at Lake Erie ports. Usually the car shortage is not felt until September. If it becomes pronounced early in the season, it will make the handling of the enormous volume of ore that must come down this year an extremely difficult matter.

Following are ore shipments by ports:

Port and Dock.	Apr. 1906.	Apr. 1907.
Escanaba	243,254	291,823
Marquette	85,216	10,047
Ashland	134,302	15,270
Superior	210,263	106,678
Duluth	383,643	101,909
Two Harbors	390,708	105,248
	1,447,386	630,975

IRON SITUATION.

Following the recent sharp advances in the prices of pig iron there has been much activity in nearly all buying centers during the past week. Throughout the country it is becoming more clearly apparent that American production for the last half of the year will fall considerably short of the demand, and many consumers are looking to foreign iron for relief. The monthly statistics of pig iron production, compiled by THE IRON TRADE REVIEW, show an output of 2,191,535 tons for April, an increase of about 5,000 tons over March. In view of the frequent blowing out of stacks for repairs, this showing is surprisingly favorable. Owing to the continued advances in prices of materials, manufacturers of all kinds of engines have either advanced their prices or will do so at an early date. Similar advances in prices of machine tools and machinery are to be expected. The scarcity of crude steel continues, and bar iron is selling at lower prices. Though no large orders for rails for 1908 delivery have yet been received, the companies are figuring on tonnages fully as large as those of 1907.

NAVIGATING DULUTH-SUPERIOR HARBOR.

The rules and regulations, recently adopted by the war department for the use of the canals and channels in the harbor of Duluth-Superior, have been issued in printed form. These rules and regulations are posted in conspicuous places about the harbor at Duluth. Copies can be had from the superintendent of the two canals, American and Canadian, at the Sault, and also from the United States express offices at Houghton, Mich., and Duluth. Owners and masters should by all means obtain copies of these rules and regulations.

NON-REVERSE COURSE FOR THE LAKES

Editor MARINE REVIEW.—The suggestion that vessels pursue entirely separate courses when going in reverse directions to lessen the chances of collision in thick weather, has created a whole lot of favorable comment from masters, owners and others interested in lake sailing.

No master having the welfare of his owner at heart could help but give his encouragement both in the introduction and adoption of such a plan, as the idea is an excellent one and one that is greatly needed.

If this system were put into practical use the benefits derived from it would number more than the main object sought—the prevention of collision. In the first place the work of navigating the ship would be lessened, since there would be a less number of courses to make good and keep track of, as well as turning points and the runs on each stretch would be greater. The chances of stranding would also be lessened, since the track of the ship would be farther from the shore and the turning points now and so long in vogue. The matter would then rest with the end or last course to the point where the channel narrows to the connecting waterways. In support of this plan it can be justly said that its adoption would not only be of benefit to the owner in lessening the risk of collision, but it would be helpful to the master in another way. It would not only be necessary but an incentive for him to keep better track of his boat; his courses, log and distance. In fact, it would make a better man of him and when a master can better himself in this way he is worth just that much more to his owner.

Fully two-thirds of the captains sailing boats today have a mania for keeping the land close aboard. These men depend too much on the lay of the land for their courses instead of the true course, compass corrections, four-point bearing, log and distance, etc. So long as the weather remains clear courses are easily verified from the looks of the land, and any change necessary is accordingly made. It is this apparent ease that courses are verified in clear weather that is responsible for such gross carelessness on the part of the master, for when thick weather comes on what little confidence he had in himself is gone. He begins to haul away from the land and is guided a great deal by other boats' fog signals. The result is that the reckoning is lost track of; and this

is not the worst feature either, they are getting in the tracks of other vessels, for they also have a mania for "lining up" with the fellow coming from ahead to get the course he is making, forgetting the fact that the fellow ahead is probably doing the same thing.

Every master should make it a cast-iron rule to make his own courses and not to be guided by the other fellow or fellows. In this respect he should go on the assumption that his is the only boat afloat. A vessel should be navigated with the same care and caution in respect to making courses and distances in clear weather as in thick weather. If a vessel can make good her courses and distances in clear weather she can easily make them in thick weather. A vessel that has no courses in clear weather cannot expect to make courses in thick weather, and this is the great cause of stranding and collision on the lakes.

The writer, on one occasion, was making the trip with one of our modern lake steamers. It was on the run from Detour to Middle island. Ours was the first boat to lock through at the Soo the evening before, and we were hung up there on account of snow, it being late in the fall. Before morning there were tied up alongside and ahead of us, some twenty steamers, so that when they started down the river the next morning we were the last one to get away. On the run from Detour down there were no two boats going over the ground the same nor even parallel with each other. They were spread out in various directions, some steering a course that would fetch them away out if continued and others that would have fetched them away in. Being astern of the fleet we had a good opportunity to take in and size up the situation. We set our course by an azimuth and figured on fetching four miles off Middle island when it bore abeam. When we got steadied on our course it looked as if we were bound to a different turning point than the rest of the fleet. So different was our course from the others that the master made the remark that the course we were on would never fetch Middle island, and he would bet on it. When asked his reasons for such a statement (we knew all the time what he was going to say), he said it was the way the other fellows were going that made him think so. He said if I were to shape a course for this boat right now I would line

up with the center of the bunch and steer the course shown by compass. Another instance of following the fellow or fellows ahead. The writer then explained to the master the inconsistency of such a proceeding, winding up with the statement that our course was figured from a scientific standpoint based upon the laws of reason, whereas, his was but little better than a good guess, backed up, of course, by good judgment. The master had confidence in the writer and let him have his own way in the shaping of courses. Our course turned out to be an excellent one, and we were within an eighth of a mile from the point determined on. Of all the courses it was ever our luck to see were steered by the fellows that started ahead of us. That night those that were outside of us hauled in and those inside of us hauled out. We don't believe that there was one of them that steered the same course for more than two hours at a stretch. Several of them, from the zig-zag courses they were making, looked like schooners on the wind. One fellow that was some four or five miles outside of us when we got down in the vicinity of Presque Isle hauled in and steered about SSW and crossed our course just astern of us. He continued on this course for about 2 miles all the time hauling more to the southward and when he got hold of Presque Isle light he steered out again about ESE till we lost track of him. Those fellows that were inside of us hauled out in the same manner. From these courses one could not help but know that they were not acquainted with the simple method of passing off a light at any required distance. We were no faster than the most of these boats ahead of us but we passed all those that had been changing their courses so often. Now, just imagine a boat steering such courses in thick weather. Is it any wonder then that some masters lose track of their vessels in thick weather? If they cannot keep any better track of them in clear weather than in the instance just cited what is to be expected of them in thick weather? How often we hear the remark on board—the master to his mate—"let her go so-and-so by compass till we meet something ahead." Also, when a fleet of boats start from the same point bound to the same turning point, "Let her go so-and-so for awhile and see how we line up with the other fellows." Each one goes on the assumption that the other is right; when

the chances are that both are wrong. How any man claiming ordinary intelligence can reason things this way is beyond our comprehension. If a man would conduct his business ashore in the same manner that some men sail their boats they would soon find themselves on a lee shore without room to tack.

Another great folly that our masters and mates have fallen into either through carelessness or negligence, if not ignorance, and that is they will steer the same course from one turning point to another turning point, no matter what their distance may be from the turning point at the start. That is to say, supposing the course from a point $2\frac{1}{2}$ miles east of Harbor Beach to a point 2 miles east of Thunder Bay island is N by W $\frac{1}{4}$ W. Well, now supposing on the run up from Port Huron lightship the course steered fetched them off Harbor Beach farther than usual, say 5 miles, they would steer the same course to Thunder Bay island and expect to fetch off 2 miles the same as if they had been $2\frac{1}{2}$ miles off at Harbor Beach. When they fetch out farther than usual they do not lay it to the real cause. The next time they run this course they will change it by an eighth or quarter point, and as likely as not they may be about the right distance off Harbor Beach; the result is that they fetch in on the course at Thunder Bay island. It is again laid to every cause but the correct one. A boat to fetch right on any course must know her starting point (or turning point) and the course to the objective point. If she does not start right she cannot finish right.

The great fault with the majority of lake masters and mates is in not using the various bearing methods for determining the distance off the turning points, etc. This is a very important duty of every watch officer and it should be made compulsory on board every boat. How is an officer to tell how far his ship is off a certain point unless he so figures it? He cannot judge his distance and come anywhere near it, especially if his vessel is a considerable distance from the object. But this is nevertheless the way the majority of steamers are navigated. It is simply gross carelessness on the part of the watch officer to go by a light or point of land, and especially a turning point, not to determine his distance from it when abreast by one or another of the bearing methods known to every navigator. The 4-point bearing and its use is so simple and so serviceable that no one should be given a license who does not understand it and how to use it. Although the bearing method is an essential requirement to safe coasting there is every reason to believe that it is habitu-

ally disregarded by at least 75 per cent of lake masters. They simply judge their distance off by the eye alone. This is the rankest kind of reckoning and should not be tolerated by either owner, insurer or inspector. There are no two men who can judge distance alike. The writer only recently had an excellent opportunity of proving this to his own satisfaction. It was a very clear moonlight night with a great deal of refraction in the air. We were steering along the land and the master had set the course to fetch 2 miles off a certain light. Just before we made the light the master in discussing the course informed us what he was steering and where he expected to fetch. A reference to the chart at once showed us that the course then being steered would carry well out from the light. It was while we were discussing the matter on deck that the light was picked up. From all appearances the light looked as though it was in just about the right place to be 2 or 3 miles off when abreast of it. The light appeared to be off at a distance of not more than 6 miles, though at the time we were actually 16 miles distant from it. A single bearing of the light at once disclosed the fact that we would be off between 7 and 8 miles when abreast of it. Such was the case, but to have simply judged the distance one would swear by all that was holy that the light was not more than 3 miles away. Owing to the changeable conditions of the atmosphere the distance of visibility is one of the most deceiving of all natural phenomena.

CLARENCE E. LONG.

QUESTIONS ANSWERED.

Editor Question Dept., MARINE REVIEW.

Question.—Will you kindly explain the simplest way of working problems like the following: (1) A steamer makes a mile 5 mins. 20 sec.; what is her speed per hour? (2) A steamer runs 14 miles an hour; how long should it take her to run a mile? (3) A steamer made $17\frac{1}{2}$ miles in 1h. 16m.; what was her speed per hour and how long does it take her to run a mile. (4) If a steamer makes a mile every 5m. 36s. how far should she run in 1h. 22m.?

I consider such examples as these of the utmost importance, and it is imperative that everybody on board, especially the officers, should know the solutions of same at a moment's notice. I have been wheeling and watching for the past four seasons and have never heard this subject mentioned on board. The first time I ever saw it was in your instructions and questions, and it struck me as being something that was absolutely necessary to know in lake piloting or where time courses

are used so much. The officers on the boats I have been on get their time between turning points in the course and enter it in the log-book and that is about all the attention they give the matter. To get this time it is necessary to run over the course several times. What is a proper and practical method of handling this subject? I am much interested in your instructions, they are so clear and simple. Thanking you in advance, I am

Yours sincerely,

ONE INTENSELY INTERESTED.

Sault Ste. Marie, Mich., Feb., 1907.

Answer.—Problems like the first you mentioned should be worked thus:

Divide the number of seconds by 60, since 60 seconds equal a minute, therefore, any given number of seconds must be a part of 60 seconds. Dividing the seconds by 60 gives the decimal part that the seconds is of a minute. When you have found what decimal the seconds are of a minute, attach it to the right hand of the number of minutes given in the problem. For example, we will take your first problem, 5m. 20s. 20s. divided by 60 equals 0.3 of a minute or 0.33 of a minute, found thus: 60)20.0(.3

180

or thus, if carried out to hundredths:

60)20.00(.33

180

200

180

In other words, 20 seconds is 1-3 of a minute, being the same thing as 20-60, 0.3 is practically 1-3, so is 0.33. Hence, 5m. 20s. expressed decimally is 5.33 mins. If it takes 5.33 mins. to make 1 mile, in 60 mins. the ship will have run as many miles as 5.33 mins. is contained times in 60 mins., or thus:

[per hour.

5.33)60.000(11.06, practically 11 miles

533

670

533

3700

3198

Examples like the (2) are to be worked as follows: Simply divide the number of minutes in an hour by the speed per hour; thus:

14)60.0(4.2 minutes to make a mile.

56

40

28

Note.—To get the number of seconds equal to the decimal part of a minute, multiply the decimal part by 60 thus, 4.2 minutes equals 4m. 12s., since $.2 \times 60$ equals 12.

Examples like (3) are worked as follows: Reduce the time run to minutes and divide the distance run by it; thus, (3) 1h. 16m. equals 76 mins, and $17\frac{1}{2}$ equals 17.5 and

76)17.50 (.23 of a mile per minute
152

230

228

If .23 of a mile is made in 1 minute in 60 minutes $60 \times .23$ of a mile is made, which equals $(.23 \times 60)$ 13.8 miles per hour.

Here is another way of doing it which is more direct, and consequently less work and figures: Make improper fractions of the given terms and divide; thus, if in 1h. 16m. a vessel's speed is $17\frac{1}{2}$ miles in 1h. it will be as much as 1h. 16m. is contained times in $17\frac{1}{2}$, or thus: 16m. is 4-15 of an hour, hence 1h. 16m. equals 1 4-15 hours, and this turned into an improper fraction equals 19-15 and $17\frac{1}{2}$ is 35-2, therefore, to divide 35-2 ($17\frac{1}{2}$) by 19-15 invert the terms of the divisor, 19-15 being the divisor, or thus, 15-19; we proceed as in multiplication of fractions:

15 35 525

— \times — = —

19 2 38 equals 13.8 (525 divided [by 38])

Examples like (4) can be worked this way: Convert the seconds of time into the decimal of a minute by dividing it by 60. Note.—If we divide the number of seconds by 60 to get the decimal of a minute we must affix a cipher to the seconds, but if we divide simply by 6 we can put a decimal point between the two figures standing for the seconds. This decimal so placed allows for the cipher taken from 60, or what is the same thing as dividing by 60 and affixing a decimal point and cipher to the number of seconds to be divided. For example. 36s. is .6 of a minute; found thus, 60)36.0(.6 of a min. or thus, if the cipher is cut off from 60: 6)3.6(.6 of a min.

36

Hence, 5m. 36s. is the same thing as 5.6 minutes. 1h. 22m. is the same thing as 82 minutes, hence, if one mile is done in 5.6 minutes in 82 minutes as many miles will be run as 5.6 minutes is contained times in 82 minutes, or thus:

5.6)82.00(14.6 miles.

56

—

260

224

360

336

You are correct in thinking and saying that this is an important subject and one everybody on board should be perfectly familiar with. You are on the right track. Just keep going.

LONG.

Navigation Editor MARINE REVIEW:

I would be greatly pleased if you would answer the following questions in regard to the hand lead and line for measuring depths: (1) How many marks, and how many deeps. (2) What is the proper way of calling off 5 fathoms, 6 fathoms, $5\frac{1}{4}$, $5\frac{1}{2}$ and $5\frac{3}{4}$ fathoms. (3) How do you distinguish the colors of the rags used in the night time. (4) In marking off a lead line do you start from the end of the lead or from the end where the line is fastened? I have heard considerable discussion among licensed men on these points, and as their answers are so different from one another's I thought I would ask you for an explanation. I have asked these questions from licensed men but their answers are too evasive.

ONLY A WHEELSMAN.

Port Huron, Mich., March, 1907.

Answer.—(1) 9 "marks" and 11 "deeps." The fathoms on the lead line that are marked are called "mark," to distinguish between those that are not marked. The fathoms marked are: 2, 3, 5, 7, 10, 13, 15, 17 and 20 (nine in all). The deeps are those fathoms not marked, and are: 1, 4, 6, 8, 9, 11, 12, 14, 16, 18 and 19 (11 in all).

(2) 5 fathoms is read or called off, "by the mark 5." 6 fathoms is read "by the deep 6," "and a quarter 5" for $5\frac{1}{4}$ fathoms; "and a half 5" for $5\frac{1}{2}$ fathoms; "a quarter less 6" for $5\frac{3}{4}$ fathoms. The same rule or principle holds good for all the other fathoms and their fractional parts.

(3) They are distinguished by the feel, a cotton and wool, cloth being used for the purpose.

(4) From the bottom end of the lead.

The army transport Buford recently left San Francisco for Chinkiang, China, carrying a cargo of 5,000 tons of provisions for the starving Chinese. The efforts of Mr. Louis Klopsch, of the *Christian Herald*, of New York, have accumulated this cargo, which is said to be worth \$100,000. The Buford will return with troops from Manila after completing her task in China.

AT THE HEAD OF THE LAKES.

Duluth, May 6.—At this writing the blockade of boats in the harbor here is practically a thing of the past. For a week a fleet consisting on Monday last of some 30 odd boats has been gradually decreasing until now the congestion is practically over, and the delays at the coal docks, while severe in the case of some of the boats, has served to spread the fleet out so that a repetition will probably not occur as the boats reach lower lake ports. As a result of the mad rush from the Soo for dockage at Duluth, the boats strung out in a continuous parade from Whitefish Bay to the head of the lakes could be seen for 48 hours, with no less than four or five boats in sight all the time, filing through the canal. Undoubtedly a record for tonnage entering a harbor within a given time was established for the world, and a spectacle was afforded as indicated in a small degree by the picture accompanying which was both unique and splendid and which, while dangerous in no small degree, was of such magnitude as to make appearances of risk insignificant.

The coal docks were worked as never before, being for the time almost snowed under, and the unloading of the tonnage at hand has been no small record in itself. The ore docks were congested for, but a short time, as most of the boats were loaded with coal, so that by Thursday the docks at Duluth and Superior were handling their boats with ordinary dispatch, though at Two Harbors the congestion which was rather bad at times continued until the end of the week and is not altogether ended even at this time. It happened that a number of boats coming up light though leaving lower ports as much as two weeks and more after coal laden freighters received their cargoes and cleared from Duluth before the coal boats were unloaded. This delay has cut down the April shipments of ore from the head of the lakes about 600,000 tons, though this handicap as compared with last year will be made up in part during the time when last year the boats were tied up by the strike.

Despite the heavy receipts of coal at this port during the latter part of April the supply on the docks has not grown greatly because the movement of coal by rail to the interior has been as heavy as the water shipments. Every effort is being made to avoid any repetitions of last winter's scarcity and dealers are being forced into taking their supplies early in the season. As a result the railroads with perhaps one exception have the coal situation well in hand and at present are in good shape.

While leaving Duluth harbor Sunday afternoon loaded with ore the steamer B. Lyman Smith grounded twice in the bay. The steamer being desirous of getting coal at the Northwestern Fuel Co.'s Duluth dock was in pretty close to the docks and grounded first off Sixth avenue west and again in going from the coal dock to the canal. In both instances her own propeller finally set the steamer free.

The first boat was loaded at Duluth this year on April 20, as compared with April 11 in 1906, and at Two Harbors it was April 18 this year instead of April 9. During April there were

forwarded by lake and 212,237 bu. by rail. Following is the comparative summary for April, 1907 and 1906:

RECEIPTS.		1907.	1906.
Wheat	.....	5,760,264	1,162,088
Corn	.....	13,475	4,196
Oats	.....	317,006	548,380
Rye	.....	31,797	16,170
Barley	.....	1,021,805	270,760
Flax	.....	1,826,387	1,280,751
Total grain	.....	8,970,734	3,282,345
SHIPMENTS.		1907.	1906.
Wheat	.....	3,748,056	2,314,383
Corn	.....	11,199	.....
Oats	.....	330,701	1,605,589
Rye	.....	20,314	44,638
Barley	.....	312,676	1,303,961
Flax	.....	523,771	2,976,310
Total grain	.....	4,946,717	8,244,881

Work is actively progressing on the

Mason of the Tomlinson line has cleared on its second trip from this port this season, having made a round to Buffalo with grain.

It is said that a well defined tendency on the part of vessel captains and mates to make their homes at Duluth-Superior is evidencing itself. The reason back of it is a comparatively obvious one. The distributing ports on the lower lakes are very numerous and the same boat seldom goes to the same port twice in succession at the end of the down trip and if the vesselmen live on Lake Erie for instance they probably will get into their home port but once or twice a season.

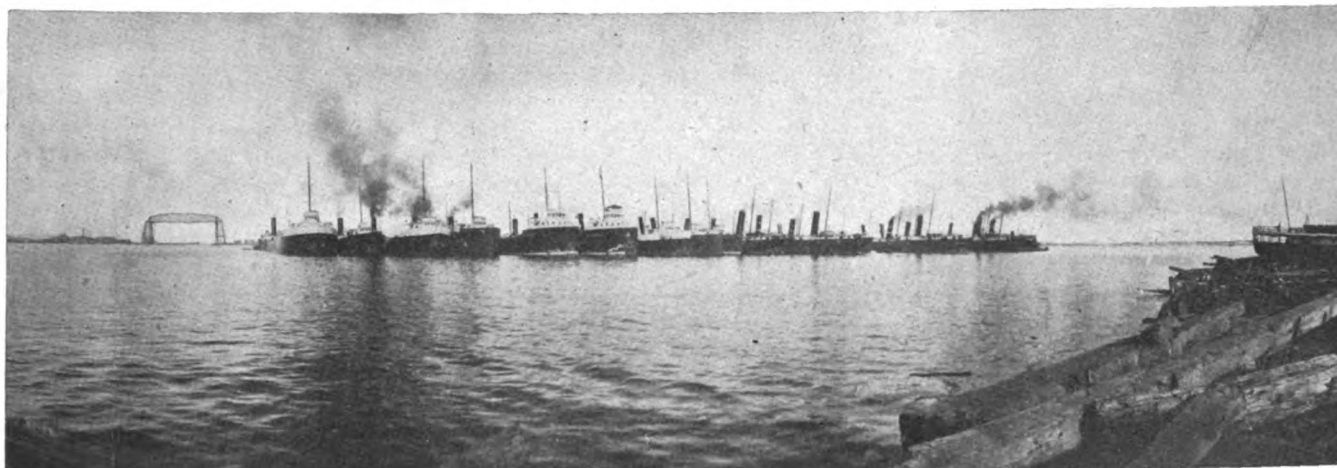


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CONGESTION OF FREIGHTERS IN DULUTH HARBOR.

shipped from Duluth 101,909 tons, against 383,643 tons in April, 1906; from Two Harbors, 105,249 tons compared with 390,708 tons last year; and from Superior, 106,678 tons as against 210,263. This shows an aggregate shipment in April this year of 313,836 tons against 984,614 tons, or a falling off of 670,778 tons. It will be interesting to note when the figures are available next week the amount of ore shipped with all of the boats waiting for cargoes. At present the railroads are getting the ore down in good shape, as for example the Duluth & Iron Range delivered during April 240,310 tons to the dock in contrast to the shipment of less than half that amount.

During April, however, there was a record movement in grain. A comparative statement for the month in 1906 and 1907 is given. As shown, nearly 9,000,000 bushels were received, of which over half has been shipped. The rate remains at two cents. The statement for the week ending May 4 is as follows:

	Receipts.	Shipments.
Wheat	1,491,441	2,588,106
Oats	91,397	55,936
Rye	9,108	90,727
Barley	202,200	597,317
Flax	370,862	766,505
Corn	3,119	2,338

During April grain receipts were 8,970,734 bu., of which 4,734,480 bu. were

new bituminous coal dock of the Duluth, Missabe & Northern railroad. It is located just east of the ore dock and will be 1,800 ft. long and 600 ft. wide. It will be built of concrete in large measure, and will have a storage capacity of 350,000 tons. It is to be entirely operated by electricity and will be equipped with the Mead distributing system and three rigs. The new coal dock of the Duluth & Iron Range Railroad at Two Harbors built, for the most part, last year and operated for the first time about a week ago, is also an electric dock, though here the distributing is done over an electrically operated bridge which is movable over the entire dock and has a span from the rigs on the water edge back to the carloading bins. The dock is about 600 ft. long and has a capacity of about 200,000 tons.

Lumber shipments are still light, as there has been but one mill sawing all winter, and the others have not yet started. The shipping rate is \$2.50 per thousand. The steamer Alva of the new Chicago & Duluth Transportation Co., first of this line's boats to reach port, arrived Thursday with package freight. The two other boats chartered to the same company are the Canastoga and the Gratwick. The Hoover &

At the head of the lakes the situation is quite in contrast for a large majority of the trips up end at Duluth-Superior so that a captain living here may get home practically every round trip.

AVERAGE ORE RATE.

The MARINE REVIEW has just compiled the average rate at which all ore, both wild and contract, was moved from the head of the lakes to the lower lakes during the season of 1906. The rate is an absolute one, as the figures are obtained directly from the shippers. Of course, the great bulk of ore was moved at the flat rate of 75 cents, but certain shippers have continuing contracts somewhat lower than this figure, and a small amount was moved at a rate considerably higher than 75 cents. The average rate works out at 75.079 cents. The average rates for several seasons past have therefore been as follows:

1906	75.079
1905	75.06
1904	72.54
1903	84.01
1902	77.49
1901	79.99
1900	120.7
1899	79.4
1898	59.0
1897	63.8

The Vulcan Works, Stettin, Germany, have the contract for building the new North German Lloyd liner.

SCIENTIFIC LAKE NAVIGATION

BY CLARENCE E. LONG.

NAPIER'S DIAGRAM.

It is often of the utmost importance in various branches of physical science to represent tables of related numbers by means of curve lines, or other figures that show to the eye the nature of the relations or laws expressed, or rather concealed, within the mass of figures constituting the tables. Not only does such a mode of representation at once manifest these laws—almost rendering them palpable—but it further points out in what cases natural laws are not represented, and therefore what the cases are that require a greater amount of observation. These modes of representation are commonly known as Graphic Methods.

Various "graphic methods" of delineating the deviation have been devised; but the method introduced here is due to J. R. Napier, and is one peculiarly adapted for this purpose, as it is equally applicable whether the points on which the observations have been made are or are not precisely equidistant. It requires no calculation, and only a moderate degree of neat-handedness.

The method consists of two parts, the diagram and the curve. The diagram is the same for all vessels.

CONSTRUCTION OF THE DIAGRAM.

In this method the diagram consists of a central or vertical line of convenient length—say 18 inches—which may be considered as representing the margin of the compass card cut at the north point, and straightened and extended in the following way:

N E S W N

This line, which may be taken to represent no deviation, is divided into 32 equal parts representing the 32 points of the compass, commencing at the top with North, and ranging in order of N by E, NNE, etc., and ending with North at the bottom. The central line is then intersected at each of the 32 points by two straight lines, one a plain line and the other a dotted line. The plain and dotted lines make an angle of 60 degrees with the central line and with each other, and with the parts of the central line intersected form a set of equilateral triangles and so converting the diagram into a simple addition and subtraction table. On the right side of the central line the dotted lines incline downwards, and the plain lines upwards. The reverse is the case on the left. In

other words, the central line is intersected at the angle of 60 degrees by dotted lines drawn upward from right to left, and at the same angle downward from right to left by plain lines. The central line is further divided into 360 equal parts representing degrees, and these divisions are numbered from 0 degrees at the top to 360 degrees at the bottom. They are also numbered, according to the usual mode of dividing the compass card, from 0 degrees at North and South up to 90 degrees at East and West. The division of the central line into degrees serves as a scale by which the deviations are laid off.

It is very important to remember that the plain lines always represent correct magnetic courses, and the dotted lines compass courses.

The least number of observed deviations available for obtaining a complete curve are the deviations on 4 points distributed equally, or nearly so, round the compass; but, if possible, the deviations should be observed on 8 or more points. If the deviations are observed on 4 points only, these should be at or near NE, SW, NW and SE, and from these it is possible to form a fairly approximate curve. The points next in importance are N, S, E and W. If the deviations have been observed at or near the eight principal points, a curve can be drawn which will give the deviation on every point of the compass within very small limits of error.

From this it is plain to be seen that where a compass has unusually large deviations the irregularities would be considerable, and the deviations from such a curve could not be relied upon. Compasses are not unfrequently so badly placed that the deviation amounts to so much as 14 points and sometimes more. It would be next to an impossibility to draw a correct curve of it. Take where the steering compass is but a few feet from the steam steerer, its deviations would be so large and irregular that before a curve could be drawn of it at all it would first have to be licked into something like shape by a liberal use of magnets, when the remaining deviations might be satisfactorily drawn to a curve, but it is safe to assume that the curve would not answer for any great length of time. This would be no fault of the curve or the diagram used, but the fault would lie with the compass, all

of which is explained in its proper place.

CONSTRUCTION OF THE CURVE OF DEVIATION.

Easterly deviations are laid down to the right of the central line, westerly deviations to the left.

The amount of the deviation is taken from the scale of degrees on the central line; then, if the deviation has been determined with the ship's head on an exact compass point, lay off the amount of the deviation on the dotted line which passes through that point; but if not observed on the exact point, then on a line parallel to the dotted line, the compass course or direction of the ship's head being still taken from the central line, and mark the point so determined with a cross, or dot encircled in ink. Perform the same operation for each observed deviation. Then with a pencil and a light hand draw a flowing curve, passing as nearly as possible through all the crosses, or dots encircled; and when satisfied that the curve is good, draw it in ink. This then is the curve of deviations.

If any of the pencil marks be out of the fair curve, it may be assumed that an error has been made in the observations for that point. This is not necessarily so, for it may be due to an irregularity of the deviation; a couple of observations will tell the story.

The process will be best understood by explaining the projection corresponding to the observations as given in the following table. They are the same deviations as were observed off Chicago.

The deviation curve is drawn for the observations made off Chicago in order to prove the work, and also to get the deviation corresponding to the correct magnetic course instead of the compass course; also to show the deviation between the whole points, etc. The student should compare the diagram and its deviation curve with Deviation Table I.

The following Deviations were taken from Table I, the eight principal points of the compass being used for the purpose of explaining the diagram and its curve:

Ship's Head by Compass.	Deviation (natural).
North	12° Wly
NE	7° Ely
East	16° "

SE	16° Ely
South	12° "
SW	1° "
West	16° Wly
NW	24° "

We shall now proceed to show the application of the foregoing rules:

Ex. 1.—The first compass course on which an observation has been made is North, we will say, and the observed deviation is 12 degrees Wly. With a pair of dividers take from the central line (any place on the scale) a distance equal to 12 degrees, and from North on the central line lay off the Dev. on the dotted line which passes through that point toward the left—the Dev. being Wly.; at the extremity of the distance make a dot or cross.

Ex. 2.—The next point of the compass on which an observation has been made is NE, and the observed Dev. is 7 degrees Ely. With the dividers take from the central line a distance equal to Dev. 7 degrees, and from NE on the central line lay it off on the dotted line—to the right, the Dev. being Ely., and the point so determined mark with a dot or cross.

Ex. 3.—East being the next point of observation lay off 16 degrees from it on the dotted line to the right—the Dev. being Ely., and mark it the same as before.

Ex. 4.—Do precisely the same with SE as with E, the Dev. being of the same amount and name.

Do the same with South, 12 degrees Ely., or to the right; SW, 1 degree Ely., or to the right; West, 16 degrees Wly., or to the left; NW, 24 degrees Wly., or to the left. Lay off from each of these points on the dotted line the amount of the deviation called for, and make a dot at each such point.

Then, with a pencil and light hand draw a flowing curve that will pass as nearly as possible through all the crosses or dots, and if satisfied with the curve in pencil, draw it in ink. The learner should take a pair of dividers and go through with the above process on the diagram here given (see plate No. 35). He should then take a blank diagram, and mark the curve on it, and compare it with the one here given. From his curve let him work the examples following, and see how near he can come to the answers given. The student should be very careful. Take your time and you cannot help but make a go of it. By being careful the same blank diagram may be used for the plotting and drawing of the curves of several different sets of deviation observations. If necessary he can erase the old lines to prevent possible confusion. Do not become

discouraged if your answers do not agree with the ones here given to the degree.

HOW THE CURVE IS USED.

The curve of Deviation having been completed, the diagram affords a ready and convenient method of applying the deviation to the ship's course. This correction may be required as follows: 1st, from the compass course which has been steered, it may be required to find the correct magnetic course to be laid down on the chart; 2nd, from the correct magnetic course given by the chart, it may be required to find the compass course on which the ship's head ought to be kept; 3d, if one or more bearings of the land are taken, to correct these bearings by the amount of the deviation due to the direction of the ship's head at the time. The corrections are given by the following rules:

TO FIND THE DEVIATION OF ANY COMPASS COURSE.

Rule.—On the central line find the given course; then with a pair of dividers, measure the distance from that point to where the curve cuts the dotted line passing through the course; but if no dotted line proceeds from the course, then measure from the course on the central line to the curve in a direction exactly parallel to the nearest dotted lines; that distance measured on any part of the central line will give the deviation in degrees.

EXAMPLES.

What is the Dev. on compass course NE by E for the deviation curve, Plate 35?

Having found the given course on the central line, proceed as follows: With a pair of dividers measure the distance from NE by E to where the curve cuts the dotted line proceeding from that point; this distance taken to the central line (at any place on the central line) gives 10 degrees Ely.

Required the Dev. to compass course WSW?

Find WSW on the central line, measure the distance from that point to where the curve cuts the dotted line proceeding from it; this distance taken to the central line gives Dev. 8 degrees Wly.

What is the Dev. for compass course N 51 degrees E?

Place one leg of a pair of dividers at N 51 degrees E on the central line, and from thence measure the distance to the curve in a direction exactly parallel to the nearest dotted lines; this distance taken to the central line gives the deviation 9 degrees Ely.

Find the deviation for compass course N 84 degrees W. Find N 84 degrees W on the central line, and

placing one foot of a pair of dividers on that point, from thence measure the distance in the direction of an imaginary line drawn parallel to the nearest dotted lines; apply this distance to the central line, which shows the deviation for the ship's course 18½ degrees Wly.

We have now the following easily applied solution of the two following problems:

PROBLEM 1.—FROM A COMPASS COURSE TO FIND THE CORRESPONDING CORRECT MAGNETIC COURSE.

Given the compass course, to find the corresponding correct magnetic course. Bear in mind that the curve is only good for that certain compass that the observed deviations were taken for.

Rule.—On the central line find the given compass course, whether for standard or steering compass, and move on the dotted line drawn from it, or in a direction parallel to the dotted lines till you reach the curve, then move on a plain line, or in a direction parallel to the plain lines, till you get back to the central line. The point on the central line at which you arrive is the correct magnetic course required. It will be observed that this is merely the addition or subtraction, as the curve is to the right or left of the central line, of the deviation on the course, since the three sides of the triangle passed over by the pencil or leg of the dividers are all equal.

Note.—The directions in the above rule are easiest done by means of a pair of dividers. To move on the dotted line, or in a direction parallel to it, place one leg of a pair of dividers on the course, and the other leg at that point on the curve which is intersected by the dotted line proceeding from the course, or a point on the curve where a line included between the leg of the dividers on the central line and the leg on the curve shall be exactly parallel to the nearest dotted lines, then to return to the central line—keep the first leg of the dividers fixed and lift the other off the curve, move in a direction parallel to the plain lines until you reach the central line; the point where the dividers cut the central line shows the correct magnetic course; or keep the leg of the dividers which is on the curve fixed, and move the other leg off the central line parallel to the plain line until it again cuts the central line, which indicates the correct magnetic course required.

EXAMPLES.

Ex. 1.—The course steered by compass is ENE, what is the correct magnetic course to lay down on the chart?

Find the given compass course ENE on the central line, then take a pair of dividers, put one leg of the dividers on ENE from which extend the other leg along the dotted line passing through the point till the curve is reached, then keep the leg on the central line fixed, move the one off the curve, and then return to the central line in a direction parallel to the plain line; it will be found to intersect it at N 81 degrees E, or E $\frac{3}{4}$ N.

Note.—You know to convert a compass course to a correct magnetic course that with Ely Dev. you allow to the right of the compass course, and with Wly Dev. to the left of the compass course to obtain the correct magnetic course. In the foregoing example you know that the Dev. is Ely. and that the correct magnetic course will be something to the right of the compass course. Bear this in mind for it will help you.

Ex. 2.—Given the compass course N 38 degrees W, and S 48 degrees W; required the corresponding correct magnetic courses?

Place one leg of the dividers on the compass course N 38 degrees W on the central line, and move the other leg out in a direction parallel to the nearest dotted line until it meets the curve; then, keeping the leg which is on the central line fixed, move the other leg in the direction of the plain lines until it returns to the central line. The point arrived at shows the correct magnetic course is N 61 degrees W, or NW by N $\frac{3}{4}$ W.

In a similar manner the correct magnetic course is found to be S 48 degrees W. In this case the Dev. is zero the compass course is likewise the correct magnetic course. Remember that the vertical line of the diagram really represents the line of no deviation, and where the curve crosses it shows the points of the compass that are free from the influences causing it; or that the attraction is such that it is in the same line with the compass needle, increasing or decreasing its directive force. In cases of this kind where the compass is free from the influences of vertical iron, etc., and only influenced by the magnetism of the ship's hull, where the deviation curve crossed the vertical line of the diagram, would show the points of the compass the ship was built on.

PROBLEM II.—FROM A GIVEN CORRECT MAGNETIC COURSE TO FIND THE CORRESPONDING COMPASS COURSE.

Rule.—On the central line take the given correct magnetic course, and move on the plain line drawn from that point or in a direction parallel to the plain lines till you arrive at the

curve; and then move on a dotted line, or in a direction parallel to the dotted lines till you get back to the central line. The point on the central at which you arrive is the compass course required.

Remember the rules for converting a correct magnetic course to a compass course.

EXAMPLES.

Ex. 1.—Given the correct magnetic course ENE to find the corresponding compass course:

Place one leg of the dividers on ENE on the central line, extend the other leg to the spot where the plain line proceeding from ENE meets the curve, then keeping the leg on the central line fixed, lift the other leg off the curve and move it in the direction of the nearest dotted line, it will be found to intersect at N 57 degrees E (NE by E $\frac{1}{2}$ E), the required course by compass.

Ex. 2.—What compass course will make correct magnetic SE?

Find SE on the central line; place one leg of the dividers on the spot and the other leg on the curve where the plain line that passes through SE cuts the curve, then keep the leg that is on the central fixed, lift the other leg off the curve and move it in the direction of the nearest dotted line till it again touches the central line; the compass course that makes correct magnetic SE is shown on the central line to be S 61 $\frac{1}{2}$ degrees E, or SE by E $\frac{1}{2}$ E.

Ex. 3.—It is found from the chart that the correct magnetic course from the ship's place to a port of destination is N 86 degrees E. What course must be steered by compass?

Find the correct magnetic course N 86 degrees E on the vertical line; place one foot of the dividers on the spot, then follow thence with the other leg in a direction parallel to the nearest plain line until it meets the curve, and then return with the other leg to the central line in a direction parallel to the dotted line; the compass course required is N 72 $\frac{1}{2}$ degrees E.

The correct magnetic course is N by E $\frac{1}{4}$ E, what is the corresponding compass course, that is, what course would have to be steered to make good a course of N by E $\frac{1}{4}$ E with a compass having the deviation as shown by curve on Plate No. 35? Answer N by E $\frac{3}{8}$ E.

Required the compass course to make correct magnetic W by N. Ans. N 55 degrees W, or NW $\frac{3}{8}$ W.

BY RHYME.

To assist the memory the following rhyme is given in the Admiralty Manual:

I.

"From compass course (correct) mag-

netic course to gain,
Depart by dotted and return by plain."

II.

"But if you wish to steer a course allotted,

Take plain from chart and keep her head on dotted."

ANOTHER SIMPLE WAY.

Here is another simple way of getting at it, and one that explains its principle, and this once understood requires no rules to be memorized for the principle will render these unnecessary. All that requires to be remembered is that the plain lines represent correct magnetic courses and the dotted lines compass courses; then not forgetting these proceed as follows:

A SIMPLE EXPLANATION.

It is required to find the compass course the correct magnetic course being given. Pick the correct magnetic course from the vertical line, and run out on the plain line to the curve (up and towards the right hand if the Dev. is Ely.; down and towards the left hand if the Dev. is Wly.) Measure this extent with the dividers, and this represents the amount of the deviation when the vessel heads on the given correct magnetic point of the compass, and it will be named Ely. or Wly. depending on which side you had to go to reach the curve. Place one leg of the dividers on the given correct magnetic course on the vertical line, and let the other leg come where it will on the same line, though the leg of the dividers must be swung toward or away from you according to the direction that the Dev. is to be allowed—away from you, or toward the top if Ely., and toward you, or toward the bottom, if Wly. Remember the rules for converting a correct magnetic course to a compass course, Ely to the left, Wly to the right, and you cannot make a mistake. Bear in mind that these simple rules for applying the deviation, whether from a correct magnetic course to a compass course, or a compass course to a correct magnetic course, always hold good, no matter whether you are moving over the face of the compass card or the various deviation diagrams. Napier's diagram is nothing more than a compass card whose edge is supposed to be straightened out.

TO GET BACK TO BUSINESS.

To revert to the above example, you know the name of the deviation from the direction you have to move from the vertical line of the diagram in order to reach the curve. If you go to the right of the vertical line to reach the curve the Dev. is Ely. and if to the left Wly. It is very plain to be seen that if the Dev. is Ely. that you

are to measure off with the dividers towards the top from the magnetic course to get the compass course. By examining the diagram you will see that by moving toward the top it is the same thing as moving to the left over the face of the compass card; and similarly, to move toward the bottom is the same thing as moving to the right over the compass card. This, you will understand, holds good only from correct magnetic to compass.

Ex.—The correct magnetic course is NW, what is the corresponding compass course?

Place one leg of the dividers on the vertical line at NW and the other leg at that point on the curve which is intersected by the plain line proceeding from the course NW, for it must be understood that this line represents the correct magnetic course of NW, in this case; then with the same extent in the dividers, and holding the first leg at NW, swing the second leg from the curve (downwards, because the Dev. is Wly) to the vertical line, and where it intersects the vertical line, read off the course. Or, in other words, merely measure off the same distance from NW downwards on the vertical line.

In the above case the compass course corresponding to correct magnetic NW will be, using the same curve as here given, N 24 degrees W, or NNW $\frac{1}{8}$ W. Try it and you will be convinced of its extreme simplicity. You know that with Wly Dev. you move to the right of the correct magnetic course to obtain the compass course. In the above example the Dev. is 21 degrees, and 21 degrees from 45 degrees leaves 24 degrees, or N 24 degrees W.

In the case of the compass course given to find the corresponding correct magnetic course, from the vertical line move on the dotted line up, and towards the left for Wly. Dev., down and towards the right for easterly Dev. Just the reverse way from correct magnetic to compass. With one leg of the dividers on the vertical line at the given course and the second leg on the curve intersecting the dotted line, swing the leg from the curve to the vertical line, scribing the leg toward the top if Wly. and toward the bottom if Ely. Or, merely measure the distance from the vertical line to the curve, and with this same distance lay it off on the vertical line from the given course according to the above rules.

The whole thing is as simple as "rolling off a log," and it is only the work of a few moments when once understood.

Note.—Persons may differ one or two degrees in their estimate of what constitutes a fair curve; it is therefore quite likely that students may find their answers differ a degree or two from those given in this work.

Construct a curve of deviations, using for the purpose the following observations:

Ships's Head by Standard compass.	Deviation (natural).
North	4° Wly
NE.	16° Ely
East	19° "
SE.	13° "
South	3° "
SW.	9° Wly
West	20° "
NW.	21° "

The following is a list of examples to be taken off the diagram when you have completed the plotting and drawing of the curve. The answers are here stated for a guide. Remember the rules and go slow. A small parallel ruler would be just the thing to run lines parallel to the dotted and plain lines when the course or deviation does not fall on the even point; though with a good eye and little care it can be done with the dividers, which are probably quicker and more easily handled.

EXAMPLES.

1. What is the Dev. on compass course NE. $\frac{1}{2}$ E. (N. 50 $\frac{1}{2}$ E.). Ans. 17 $\frac{1}{2}$ ° Ely.

Note.—By examining the table of deviation one can calculate this by simple proportion. On NE. the Dev. is 16 degrees and on East 19 degrees, consequently, on any point between NE. and E. it must be something between 16 degrees and 19 degrees. Bear this in mind.

2. What is the Dev. on compass course S. by E. $\frac{3}{4}$ E. (S. 20 degrees E.). Ans. 9 degrees Ely.

3. What is the Dev. on compass course N. 83 degrees W. Ans. 20 degrees Wly.

4. What is the Dev. on compass course S. W. $\frac{1}{4}$ W. (S. 48 degrees W.) Ans. 10 degrees Wly.

The correct magnetic course between two points is known, and it is desired to steer a compass course that will counteract the Dev. for that course, or to find the corresponding compass course.

Note.—Bear in mind that the Dev. as found for the ship's head by compass will not be the same (when the deviation is large as in this case) for the ship's head correct magnetic.

Ex. 1.—The correct magnetic course is ENE., find the compass course that you would have to steer in order to make good this correct magnetic course. Ans. N. 50 degrees E. (NE. $\frac{1}{2}$ E.).

Ex. 2.—What compass course will make correct magnetic W. $\frac{3}{4}$ S. Ans. W. by N. $\frac{1}{8}$ N. (nearly).

Ex. 3.—It is found from the chart that the correct magnetic course from Milwaukee to Pt. Betsey is NNE. $\frac{5}{8}$ E. What course must be steered by standard compass (the standard compass is supposed to be the one we took the bearings from, and the curve laid down from it). Ans. NNE. $\frac{1}{4}$ E., nearly.

Ex. 4.—On which points of the compass is the Dev. zero? Ans. N. $\frac{3}{4}$ E. and S. by W.

FROM COMPASS COURSE TO CORRESPONDING CORRECT MAGNETIC COURSE.

The course steered by standard compass (in a sailing vessel, for instance) is SSW.; required the correct magnetic course, so as to lay it down on the chart to find her position. Ans. S. 19 degrees W.

Note.—The student is apt to get mixed up which way to move from the dotted or plain lines. Here is a hint; remember the rules in correcting the compass course to a correct magnetic course; Ely, to the right; Wly. to the left. The vertical line of the diagram represents the margin of the compass card straightened out. In the last example the Dev. is Wly. and we are correcting a compass course to a correct magnetic course. The compass course is SSW., so with Wly. Dev. the correct magnetic course must lie to the left of the compass course. In converting a correct magnetic course to a compass course the rules are the reverse. Bear this in mind for it will help you.

The course steered by compass is E. $\frac{1}{2}$ N. What is the correct magnetic course? Ans. S. 76 degrees E.

IT LOOKS HARDER THAN IT REALLY IS.

Judging from the number of rules to be memorized, and the forms and operations to go through with, in this deviation curve problem, one who had not carefully studied and learned its whys and wherefores, but on the contrary had only given it a passing notice, might be led to think of it as a complicated affair. But it is not; in fact it is almost stupidly simple. The explanation in some books on navigation render this subject confusing and intricate for the want of a clear and simple exposition of its laws and principles.

The new British cruiser Boadicea which is to be built at the Pembroke dock yard, is to be engined by Messrs. John Brown & Co., Ltd., Clydebank. The Boadicea is to be of the scout type and is the first vessel to be ordered for this year's program.

ORE SHIPPING DOCKS.

Robert Angst has just compiled his valuable report on the ore docks of the upper lakes. Since the last report extensive improvements have been made in some of the docks, while others, notably Messabe No. 1 at Duluth, have been dismantled. Extensive improvements are now in progress on Great Northern Dock No. 1 in Allouez bay, and to the Duluth & Iron Range dock at Two Harbors. While the actual storage capacity of the docks on May 1 shows a slight reduction over

to be held on the evening of Wednesday, May 22. It is already evident from the list of speakers obtained for the business sessions and for the banquet, and from the very large number of members who have signified their intention to be present at the convention, that it will be by far the most brilliant and important ever held by the Association in its prosperous history.

Among the speakers at the business sessions will be:

Hon. Charles A. Prouty, of the In-

No such program of practical business talks on important present-day problems has ever been scheduled for any former convention of the association.

The chief speakers at the banquet will be Hon. Oscar S. Straus, secretary of Commerce and Labor; Senator J. P. Dolliver of Iowa, who has promised that his address shall be on "The Revolt of the Unincorporated"; Rear Admiral Charles D. Sigsbee, for the navy; Major General J. Franklin Bell, chief of staff, for the army; and Rev.

RECORD OF ORE DOCKS ON THE GREAT LAKES.

Railway	Location	Dock No.	Number of Pockets	Storage Capacity Tons	Height Water to Center Hinge Hole	Height Water to Deck of Dock	Width of Dock Outside of Part'n Posts	Length of Spouts	Length of Dock	Angle of Pockets
Chicago & North Western Ry.....	Escanaba, Mich.....	1	181	21143	28 10	48-6	37 0	21-0	11-4	39-30
" " " "	" " " "	3	226	25792	31 2	52 8	37 0	27 0	1356	45 0
" " " "	" " " "	4	250	34925	36 6	59 2	37 0	30-0	1500	45 0
" " " "	" " " "	5	232	33663	28 6	53 3	37 0	21 8	1392	40 0
" " " "	" " " "	6	320	69760	40 0	70 0	50 2	30 0	1920	45 0
" " " "	Ashland, Wis.	1	234	42120	40 0	70 0	50 2	30-0	1404	45-0
" " " "	" " " "	2	234	25710	36-6	57 8	46 0	27-0	1404	42-0
" " " "	Total		1680	256143						
*Duluth & Iron Range Rail Road.....	Two Harbors, Minn	1	202	40100	35 5	59 6	49 0	27 0	1388	38 42
" " " "	" " " "	2	208	41000	33 5	57 6	49 0	27 0	1280	38 42
" " " "	" " " "	3	170	31000	40 0	66 0	49 0	27-0	1054	43-32
" " " "	" " " "	4	168	36260	37 0	62 0	49 0	29 0	1042	38 42
" " " "	" " " "	5	168	35450	39 0	66 9	49 0	30 0	1050	43-32
" " " "	Total		916	188410						
Duluth, Missabe & Northern Ry.....	Duluth, Minn.	2	384	60120	32 0	57 6	49 0	27 9	1336	45 0
" " " "	" " " "	3	384	80640	40 7	67 3	49 0	27 9	2304	45-0
" " " "	" " " "	4	384	119274	42 0	72 6	57 0	30-1 1/2	2804	45 0
" " " "	Total		1152	260034						
Great Northern Ry.....	Superior, Wis.....	1	270	46500	32 9	57 0	49 0	27-3	1555	45 0
" " " "	" " " "	2	350	85500	40 0	72 8	62 2	32-4	2100	45-0
" " " "	" " " "	3	326	81500	40 0	72 8	62 5	32-4	1956	45-0
" " " "	Total		926	209500						
Duluth, South Shore & Atlantic Ry.....	Marquette, Mich....	1	270	27000	25 0	45 0	40 0	20 4	1700	39-0
" " " "	" " " "	4	260	28000	27 9	47 3	36 8	21 1	1200	39 45
" " " "	" " " "	5	200	50000	40 0	70-10	51 0	32-4	1206	45-0
" " " "	Total		670	105000						
Lake Superior & Ishpeming Ry.....	Marquette, Mich....	1	200	36000	30 9	54-0	50 0	21 7	1232	38-40
Wisconsin Central Ry.....	Ashland, Wis.....	1	314	48356	40 0	66 2	56-0	27 0	1905	50-45
Chicago, Milwaukee & St. Paul Ry.....	Escanaba, Mich....	1	240	50400	40 2 1/2	66-6	52 0	120 27-0	1500	45-0
" " " "	" " " "	2	240	63500	40 11 1/2	69-2	54 0	30 1 1/2	1500	45 0
" " " "	Total		480	113900						
Algoma Central & Hudson Bay Ry.....	Michipicoten, Ont.	1	12		34 0	43-4	25 0	22 6	311 9	44-0

*312 Single Pockets. 1076 Double Pockets.

the corresponding date last year, being 1,226,343 tons as against 1,282,100 tons, the actual shipping capacity by reason of modern improvements has been greatly increased. It is admitted, however, that there is still room for improvement in ore shipping docks.

NATIONAL ASSOCIATION OF MANUFACTURERS.

The National Association of Manufacturers will hold its twelfth annual convention and banquet on May 20, 21 and 22, at the Waldorf-Astoria hotel, New York city. Parts of three days are to be devoted to the business sessions of the convention, during which addresses are to be made, on some of the most important topics now before the business world, by government officials, manufacturers and others prominently identified with these subjects. The annual banquet is

to be held on the evening of Wednesday, May 22. It is already evident from the list of speakers obtained for the business sessions and for the banquet, and from the very large number of members who have signified their intention to be present at the convention, that it will be by far the most brilliant and important ever held by the Association in its prosperous history.

Hon. Francis B. Loomis, formerly Assistant Secretary of State, "Some Practical Results of the Convention Reform Agitation."

Mr. Charles M. Pepper, special agent of the Department of Commerce and Labor to investigate trade conditions in foreign countries, on "Foreign Trade: How to Get it and Keep it."

Dr. Charles P. Neill, Commissioner of Labor, Department of Commerce and Labor, on "Certain Aspects of the Child Labor Problem."

Mr. Arthur D. Dean, on "Trade Schools; the Manufacturer's or the Pedagogue's Sort."

Captain Henry A. Castle, late Auditor of the Treasury for the Post Office Department, on "Needed Postal Reform."

Dr. Joseph Dunn Burrell, whose topic will be, "The Era of Work."

HOLLAND-AMERICA LINE.

The directors of the Nederlandsch-Amerikaansche Stoomvaart Maatschappij (Holland-America Line) have issued a very favorable report for the year 1906, the success being even greater than was achieved in the previous year. The gross earnings were 4,886,986 florins, against 3,802,884 florins in 1905, and 1,443,734 florins in 1904. After writing off 2,325,096 florins for depreciation, paying all outgoings, and making substantial additions to the reserves, the surplus allows of a dividend of 15 per cent, the same as was paid for the previous year. The directors say in their report that although the increased profits would have warranted a greater dividend, they preferred rather to make a heavier write-off.

AROUND THE GREAT LAKES.

Capt. M. A. Boyce of the Pittsburg Steamship Co. steamer Clarence A. Black has resigned.

The steamer Philip Minch took the first grain cargo of the season from Fort William to Buffalo.

The steamer Northern Wave struck the east pier at Cleveland this week and damaged a number of plates.

The steamer Scottish Hero, which went aground at Goderich, has been released by the Reid Wrecking Co.

The steamer Western Star broke every blade of her wheel in the ice in going from Buffalo to Ashtabula.

The tug L. B. Johnson, which was beached near Fairport last week, has been abandoned by her owners as a total loss.

Repairs on the steamer Ireland at Superior are nearly completed. The Ireland was wrecked on Gull island last December.

The Anchor line steamer Wissahickon, building at the Buffalo Dry Dock Co.'s yard, will be launched some time in June.

The steamer Hugh Kennedy of the Mitchell fleet left Lorain on her maiden trip last Saturday, going to Escanaba for ore.

The steamer Frederick B. Wells is in dry dock at Milwaukee, having been seriously damaged in the ice. About thirty plates will have to come off.

J. G. Laird & Sons of Ashtabula are building a fuel scow for the Ironville Coal & Dock Co., to be practically a duplicate of the George B. Raser.

The steamer Henry Phipps, building for the Pittsburg Steamship Co. at the Bay City yard of the American Ship Building Co., will be launched May 11.

The steamers James E. Davidson and M. C. Smith collided in Duluth harbor Monday night in endeavoring to make the Missabe ore dock. The damage was slight.

The steamer Clarence A. Black of the Pittsburg Steamship Co.'s fleet, bound up light, struck off Point Iroquois this week and punctured a hole in No. 5 tank.

The steamer Leland S. DeGraef, building for the Weston Transit Co. at the Lorain yard of the American Ship Building Co., will be launched in about three weeks.

Capt. James McKenna of the steamer Minnie E. Kelton expects to leave May 5 for the long voyage around the horn to San Francisco. The Kelton is now being caulked at Milwaukee.

The Erie canal opened for the season May 1, fifty boats clearing with 565,096 bushels of grain. The opening rates are 5 cents on wheat, 4½ cents on corn and 3½ cents on oats.

The steamer Vermillion of the Gilchrist fleet was disabled at Port Huron by the breaking of her cylinder head. Her cargo of coal will be unloaded at Detour instead of at Portage.

The three whalebacks, Bay City, Baroness and Bombay, left Buffalo for the Atlantic coast this week, having been cut down 30 ft. by the Empire Ship Building Co. of Buffalo.

The steamer J. H. Reed ran aground off Grosse Point, near Chicago, in a blinding snow storm last Friday night. The Reed was released after 500 tons of her ore cargo had been lightered.

The steamer Sioux City has been sold to the Indiana Transportation Co. by the Booth line of Duluth. The Sioux City will be used this summer in the excursion business on Lake Michigan.

James McCarty, agent of the Union Steamboat line, has been made contracting agent of the Erie railroad to succeed W. D. Blake, who has been promoted to chief of the tariff bureau at Chicago.

Hughes Bros. & Bangs' fuel scow Yankee, used in transporting coal to Johnson's island, sank at the B. & O. dock at Sandusky in such a position that no boats could get to the dock to be loaded.

The Hocking Valley railroad is removing its Brown hoist from the wharf at the foot of Buffalo street, Toledo, upon complaint of the city government that the property belongs to the municipality.

The tug L. C. Schenck of the Great Lakes Towing Co.'s fleet ran into the Michigan Central railway bridge at Welland last week and knocked the bridge off its pivot, blocking both railway traffic and navigation.

The schooner Bacon, upbound with coal in tow of the steamer Pidgeon, became disabled through the breaking of her steering gear and went on the east bank at the Lime Kiln crossing. She was later released by the tug General.

The big steamer Thomas Lynch, recently launched at the South Chicago yard of the American Ship Building Co., is now being towed by the steamer Mary H. Boyce to the Lorain yard where her machinery will be installed.

The wrecking tug Favorite, which has just been completed by the Buffalo Dry Dock Co., was given a brief trial last week and was found to work well in every particular. She will be brought to Cleveland before leaving for her station at St. Ignace.

Fast time was made in unloading a cargo of coal from the steamer Sahara last week. She carried a cargo of 8,600 tons of soft coal for the Boston Coal Dock & Wharf Co., which was

unloaded in 18 hours and 40 minutes actual working time.

Capt. Edward Dunn of the Canadian government cruiser Vigilant has been reinstated in command of the Vigilant without losing pay for the time he was suspended pending the investigation of charges against him. Capt. Dunn was completely exonerated.

Plans for the new Cleveland & Buffalo liner, contract for which it is expected will be let shortly, call for a complete machine shop to be located amidships. The purpose of this is to make the steamer self-contained in so far as minor repairs are concerned.

The Great Lakes Contracting Co. has completed its contract for constructing both concrete piers at Conneaut. A new breakwater has been constructed east of the harbor entrance and the west breakwater has been extended. The work has occupied three years.

Walter Lloyd and Henry Wright of Duluth have been awarded the contract for raising the excursion steamer Mascotte which sank at Houghton a few weeks ago. It is reported that when the Mascotte is floated she will be taken to Duluth and placed on the St. Louis river run.

The Detroit & Buffalo Steamboat Co. has just put out a fine post card on the opening of navigation between Detroit and Buffalo. This card is entitled "In the Ring for 1907" and represents two buffaloes performing in a circus ring. The buffaloes are standing on their hind legs and each carries a steamer upon its back.

The steamer Niagara has been bought by J. J. Boland & Co., of Buffalo, from the W. L. Scott estate, of Erie. The Niagara is a steel vessel 266 ft. long, 42 ft. beam and 17 ft. deep, and was built about nine years ago for John L. Crosthwaite and D. O. Mills. It is understood that the Niagara will be fitted to carry steel rails. Capt. M. S. Peterson will command her.

The steamers J. C. Gilchrist and John Sherwin collided in White Fish bay last week while attempting to force a passage through the floating ice. The Sherwin was leading the Gilchrist and when the Sherwin struck an immovable floe the Gilchrist could not stop in time and rammed her. The stern of the Sherwin was battered somewhat and the stem of the Gilchrist was twisted.

The passenger steamer Pilgrim, trading between Detroit and east shore ports along Lake Huron, was beached near the life-saving station above Port Huron this week to prevent her foundering. Her crew of twenty-six and her passen-

gers, numbering four, were safely taken off. The stranded steamer was on her way down Lake Huron on her first trip of the season. She sprang a leak and as the water was gaining rapidly on the pumps, Capt. Cotten decided to beach her. The Pilgrim was built in 1888 and is 123 ft. long and 23 ft. beam.

The new Lake Superior Line from Chicago has been opened by the sailing of the steamer Alva with general merchandise for Duluth and intermediate ports. In conjunction with the steel steamer W. H. Gratwick the Alva will give the line a sailing every six days in each direction. The officers of the new line are president, J. O. Nessen; secretary and treasurer, T. J. Prindiville; vice president and general manager, James Prindiville. The Chicago docks will be at the foot of Randolph street.

The steamer Charles A. Eddy, which was sold by the United States marshal at Cleveland, was bought by the Gilchrist Transportation Co., Cleveland, her old owners, for \$9,500. While coming down Lake Huron with a cargo of ore last season the Eddy caught fire and was abandoned by her owners. The fire was put out by the steamers Ogdensburg, Muncy and Meyers, and then towed to Port Huron. Claims were put in by the salvors but no agreement could be reached with the owners of the Eddy.

Petitions will be left at Cleveland, Sault Ste. Marie, Chicago and Buffalo for masters of lake vessels to sign urging the light house board to establish a number of fog signal stations between Duluth and a point 10 miles beyond Grand Marais on the north shore of Lake Superior owing to the dangerous character of this coast and the numerous wrecks that have occurred there. It is suggested that one fog signal station be midway between Duluth and Two Harbors and that others be located at intervals of 10 miles between Two Harbors and Grand Marais, and one at ten miles beyond Grand Marais.

The steamer Iroquois and the steamer W. H. Gratwick (small) collided at Port Huron last week. The Gratwick was bound up and was passing the Iroquois which had the barge M. B. Mitchell in tow when she was caught by the current and swung broadside directly across the bow of the Iroquois. The Gratwick received a large dent on the port side but continued on her way. The Iroquois' cargo was shifted and her steering gear disabled. The Iroquois is owned by Capt. W. C. Richardson of Cleveland and the Gratwick by the United States Transportation Co. The Gratwick is being op-

erated this season by the Chicago & Duluth Transportation Co.

Bids for the improvement of the harbors of Manitowoc, Sheboygan and Milwaukee were opened in the office of Major Wm. V. Judson, government engineer at Milwaukee this week. Berg, Smith & Nelson of Muskegon, Mich., were the only bidders upon constructing 196 ft. of breakwater at Sheboygan. For the work of removing cribs, building creek breakwater, removing old piers and building pile piers at Manitowoc, the bidders were Wm. H. Gillen of Milwaukee, the Great Lakes Dock & Dredge Co. of Chicago, and Greiling Bros. of Green Bay. For the proposed extension to the breakwater at Milwaukee bids were received from J. Hathaway and Wm. H. Gillen of Milwaukee, the Edward Gillen Dock & Construction Co. of Racine, and the Great Lakes Dredge & Construction Co. of Chicago.

DERELICT DESTROYER BID.

The Revenue Cutter Service received but one bid for the construction of the derelict destroyer known as Revenue Cutter No. 17. This was submitted by the Pusey & Jones Co., Wilmington, Del., in the sum of \$325,000, and being in excess of the appropriation could not be accepted.

ITEMS OF GENERAL INTEREST.

The steamer Henry Steinbrenner will be repaired at Lorain. She has ten broken frames and eight damaged plates.

The steamer Henry Phipps building for the Pittsburg Steamship Co. at the Bay City yard of the American Ship Building Co., will be launched on Saturday, May 11.

The ferry boat of the International Ferry Co., plying between Buffalo and Fort Erie, stranded in Niagara river this week in a dense fog. The passengers

IMPROVING HARBOR AT MILWAUKEE, WIS.

Abstract of Proposals for construction of concrete superstructure on, and building of cribs for extension of, breakwater at Milwaukee Harbor, Wis., received in response to advertisement dated March 30, 1907, and opened April 29, 1907, by Major W. V. Judson, Corps of Engineers. Amount available for the work, \$380,000.00.

	Name and Residence of Bidders.			
	1.	2.	3.	4.
	I. E. Hathaway, Milwaukee, Wis.	The Edw. Gillen Dock, Dredge & Construction Co., Racine, Wis.	Wm. H. Gillen, Milwaukee, Wis.	Great Lakes Dock & Dredge Co., Chicago, Ill.
Concrete Superstructure—				
Removing 800 lin. ft. old 24-ft. superstructure and leveling cribs—per lin. ft.....	\$9.50		\$9.00	\$10.50
Removing 3,000 lin. ft. old 30-ft. superstructure and leveling cribs—per lin. ft.....	10.00		9.00	11.50
150,000 ft. B. M. Pine Timber—Per M. ft. B. M.	75.00		60.00	75.00
15,000 lbs. wrought iron or steel drift bolts—per pound	5 cts.		5 cts.	5 cts.
125,000 lbs. round steel bars—per pound.....	5 cts.		5 cts.	5 cts.
8,200 cu. yds. concrete blocks—per cu. yd....	10.00		9.50	10.50
13,700 cu. yds. concrete in place—per cu. yd...	9.50		8.50	10.00
Total	\$268,000.00		\$244,550.00	\$284,250.00
Breakwater Extension—				
Framing 2,120,000 ft. B. M. timber and plank furnished by the U. S.—per M. ft. B. M.....		\$12.00	\$11.00	\$15.00
158,000 lbs. wrought iron or steel drift bolts—per pound		4 cts.	5 cts.	5 cts.
15,000 lbs. wrought iron or steel screw bolts—per pound		5 cts.	5 cts.	5 cts.
13,000 lbs. wrought iron and wire spikes—per pound		5 cts.	5 cts.	5 cts.
70,000 tons of stone—per ton of 2,000 pounds..		1.40	1.60	1.70
Total	*\$131,160.00		\$144,620.00	\$160,100.00
Total for entire work			\$389,170.00	\$444,350.00
* Lowest bid for Breakwater Extension.				
† Lowest bid for Concrete Superstructure.				

IMPROVING HARBOR AT SHEBOYGAN, WIS.

Abstract of proposals for building 196 feet of crib breakwater at Sheboygan Harbor, Wis., received in response to advertisement dated March 30, 1907, and opened April 29, 1907, by Major W. V. Judson, Corps of Engineers. Amount available for this work, \$20,000.

No. of Proposal.	Name & Residence of Bidders.
1.	Burk, Smith & Nelson, Muskegon, Mich.
Framing 395,000 ft. B. M. timber and plank, per M. ft. B. M.	\$9.20
Timber and plank furnished by U. S.	
30,000 lbs. wrought iron or steel drift bolts; per pound.....	4 cents
3,000 lbs. wrought iron or steel screw bolts and tie-rods; per pound	4 cents
2,500 lbs. wrought iron and wire spikes; per pound	5 cents
10,000 tons of stone—2,000 pounds to a ton; per ton	1.35
Total of Bid.....	\$18,579.00

were taken off in small boats.

The steamer Simon J. Murphy with 6,675 tons of iron ore, was unloaded at the Toledo & Ohio Central docks at Toledo in ten hours. While this is not record time it is nevertheless a good performance.

There are signs on the plant of the Ship Builders' Dry Dock Co. at Chicago announcing that the real estate is for sale. This plant was taken over by the American Ship Building Co. last year, but was closed during the strike.

ACCIDENTS TO LAKE VESSELS.

No serious accidents have occurred on the great lakes so far this year, but a glance at the accompanying table will show that they have been sufficiently numerous to make it of interest to owners, underwriters and shipbuilders. It will be observed that quite a few of the accidents have been caused by wheel chains parting in restricted channels. As all of

The bids were received from five companies, as follows: The New York Shipbuilding Co., Camden, N. J., proposed to build four tenders at \$165,000 each; or if they are fitted with special boilers, \$4,000 each additional. It proposes to build from five to eight of the tenders at \$164,000 each; and with special boilers, \$4,000 each additional.

The Newport News Shipbuilding &

IMPROVEMENT DULUTH-SUPERIOR HARBOR.

The board of engineer officers, appointed by the secretary of war to make a re-examination and survey of the harbor entrance of Duluth-Superior harbor, will meet in the Commercial club rooms, Duluth, at 10 a. m., on June 19, for a public hearing. Vessel owners and masters in general are greatly in-

VESSEL ACCIDENTS SINCE THE OPENING OF NAVIGATION.

Date.	Name of Vessel.	Nature of accident.	Place.
April 7	Sch. Plow Boy	Sank in storm.	Detroit River.
April 10	Str. N. J. Nessen	Cut by ice and sank; raised later.	Lake Michigan.
April 12	Str. Harry E. Packer	Ran aground; released later.	St. Clair River.
April 12	Str. Brazil	Hole cut in port bow by ice.	Straits of Mackinac.
April 15	Str. H. S. Sill	Struck and damaged fore peak.	Lime Kiln Crossing.
April 15	Str. Norwalk	Collided with mud scow; damaged some planks.	Cleveland, O.
April 15	Str. Ogdensburg	Ran aground; slightly damaged forward.	Point au Barques.
April 15	Str. Pathfinder	Ran aground; not damaged.	Bar Point.
April 15	Str. Louis Pahlow	Went on reef; badly damaged.	Near Sturgeon Bay, Wis.
April 15	Bge. Delta	Went on reef; rudder lost and leaked.	Near Sturgeon Bay, Wis.
April 15	Str. City of Detroit	Hit floating pile; bucket frame bent.	Cleveland, O.
April 16	Sch. Eliza Day	Capsized; pumped out.	Pyramid Point.
April 19	Str. Cartagena	Aground; not damaged.	Bay City, Mich.
April 19	Pile Driver No. 1	Sank at dock; raised.	Detroit, Mich.
April 20	Tug Record	Lost shoe and rudder while ramming ice.	Superior, Wis.
April 20	Str. W. G. Pollock	Damaged by ice.	Straits of Mackinac.
April 20	Str. Tuscarora	Damaged by ice; propeller broken.	Buffalo, N. Y.
April 20	Str. A. G. Lindsay	Aground; released without damage.	Port Huron, Mich.
April 20	Str. Penobscot	Lost shoe.	Milwaukee Harbor.
April 20	Str. C. S. Neff	Aground; somewhat damaged.	Bay City, Mich.
April 21	Str. Vulcan	Collided with bridge; six plates damaged.	Chicago, Ill.
April 21	Str. Henry Steinbrenner	Steering gear broke; struck dock; damaged bow.	Port Huron, Mich.
April 22	Str. Western Star	Lost all blades of propeller while fighting ice.	Ashtabula, O.
April 23	Str. Arcadia	Sunk in storm; total loss.	Lake Michigan.
April 23	Sch. Chieftain	Aground.	Bay City, Mich.
April 23	Str. Homer Warren	Sprung leak; nearly foundered.	Lake Huron.
April 24	Tug Searchlight	Sank.	Off Harbor Beach, Mich.
April 24	Str. Thomas Cranage	Run on sand bar; not damaged.	Superior, Wis.
April 24	Str. Bessemer	Broke high pressure cylinder.	Off Colchester, Lake Erie.
April 24	Tug Ida	Engines broke down.	Off Erie, Pa.
April 25	Str. Castalia	Ran aground.	Fighting Island.
April 25	Tug John Kelderhouse	Sprung leak; beached.	Near Dunkirk, N. Y.
April 26	Str. J. C. Gilchrist	In collision with Str. John Sherwin; stem twisted.	Off St. Clair, Mich.
April 26	Str. John Sherwin	In collision with Str. J. C. Gilchrist; stern battered.	Off St. Clair, Mich.
April 26	Str. Reliance	Aground on sand bar.	Off St. Clair, Mich.
April 27	Str. Robert L. Fryer	Broke wheel chains; ran on rocks.	Ballard's Reef.
April 27	Str. Uranus	Ran aground.	Mud Lake.
April 27	Str. R. J. Gordon	Machinery broken.	Lake Michigan.
April 27	Str. New York	Steering gear broke; hit dock; rudder damaged.	Port Huron, Mich.
April 28	Bge. Magnetic	Grounded; uninjured.	Port Huron, Mich.
April 28	Str. Clarence A. Black	Struck; punctured tank.	Off Point Iroquois.
April 28	Str. Northern Wave	Struck harbor pier; damaged several plates.	Cleveland, O.
April 29	Tug Buffalo	Sunk; total loss.	Portage Lake.
April 29	Str. Alexander Nimick	Hole stove in bow by ice; beached.	Portage Entry.
April 29	Str. Pilgrim	Sprung leak; beached.	Near Port Huron, Mich.
April 29	Str. Andrew Carnegie	Broke all buckets off wheel in ice.	Sault Ste. Marie.
April 29	Str. Vermillion	Knocked out cylinder head.	Detour, Mich.
April 29	Str. Raleigh	Struck obstruction.	Near Colchester, Ont.
April 29	Sch. Melvin S. Bacon	Broke steering gear; went ashore; stern post split.	Lime Kiln Crossing.
April 29	Str. R. S. Warner	Stranded; released uninjured.	Round Island.
April 29	Sch. A. W. Thompson	Stranded; released uninjured.	Round Island.
April 29	Str. Frederick B. Wells	Thirty plates damaged by ice.	Milwaukee, Wis.
April 29	Str. James E. Davidson	In collision with Str. M. C. Smith.	Milwaukee, Wis.
April 29	Str. M. C. Smith	In collision with Str. James E. Davidson	Milwaukee, Wis.
April 30	Tug L. B. Johnson	Sprung leak; beached; total loss.	Near Fairport, Lake Erie.
April 30	Scow Yankee	Sank at B. & O. dock.	Sandusky, O.
May 1	Str. Caledonia	Aground; released later.	Near Algonac, Mich.
May 2	Tug Sunol	Squeezed between breakwater and Str. Lake Shore; badly dam.	Ashtabula, O.
May 2	Str. Iroquois	In collision with Str. W. H. Gratwick (small); badly damaged.	Off Port Huron, Mich.
May 2	Str. W. H. Gratwick (small)	In collision with Str. Iroquois; badly damaged.	Off Port Huron, Mich.
May 3	Str. Saronic	Broke wheel.	Lake Huron.
May 3	Str. J. H. Reed	Went aground; released with serious damage.	Off Chicago.
May 3	Str. Scottish Hero	Went aground; released later.	Goderich, Ont.
May 3	Scow Leader	Sunk while lightering wrecked Str. Pilgrim; raised.	Port Huron, Mich.
May 4	Str. Winnipeg	Collided with Str. Empire City; slightly damaged.	Off Point Iroquois.
May 4	Str. Empire City	Collided with Str. Winnipeg; damaged forward bulkheads.	Off Point Iroquois.

these vessels were on their first trip this circumstance would seem to give weight to the contention that wheel chains are not properly cared for. If thoroughly inspected during the fitting-out season they would not be likely to part on their first trip.

BIDS FOR LIGHTHOUSE TENDERS.

The lighthouse board compiled on May 1 the bids received for the construction of eight lighthouse tenders to be delivered at Tompkinsville, N. Y.

Dry Dock Co., Newport News, Va., offers to build four tenders for \$189,000 each or from five to eight at \$187,000 each. The bid states that it will require 15 months for the construction of more than four tenders.

The Bath Iron Works, Bath, Me., bids on only two of the tenders, offering to construct them for \$197,000 each.

The Maryland Steel Co., Baltimore county, Md., proposes to construct two of the tenders for \$199,750 each; three at \$198,150 each, and four at \$196,500 each.

terested in this enterprise and will be fully represented at the meeting.

A submarine signal station is to be installed at Breakwall, near Buffalo. This will enable vessels to enter the harbor safely during fog. Quite a number of important points on the lakes are now being equipped with this apparatus, which is unquestionably the greatest aid to navigation that has been invented during recent years.

CRESCENT MACHINE CO.

The Crescent Machine Co., Leetonia, O., have recently moved into their new building at Leetonia which, as will be seen by the accompanying illustration, makes a commodious and well lighted factory. The company has just put out a little booklet descriptive of the Crescent angle band saw which was completely described and illustrated in the issue of the MARINE REVIEW of Jan. 3. Since that description was published the company has sold one of these machines to H. J. Devney, Ashtabula Harbor, and one to Joseph Croze, who is engaged in general ship repair work at Houghton,

proved severe obstacles to the transmission of the electric waves.

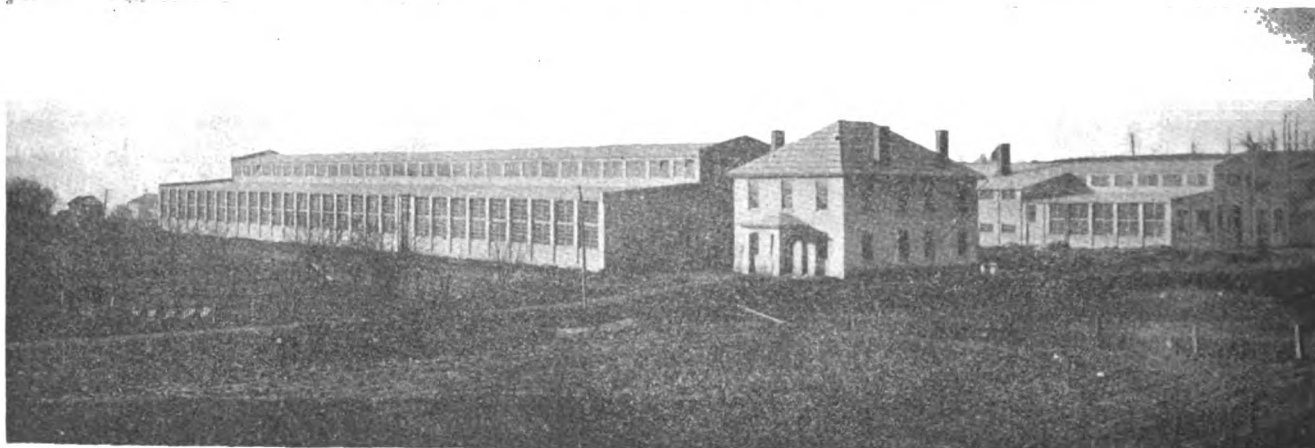
A message was also sent to Newcastle, England, containing forty words of greeting from Admiral de Richelieu, chairman of the board of directors of the steamship company, who was a passenger. The distance was over five hundred miles, and every word was "caught" by the receiving instruments.

ELECTRIC TURNING GEAR FOR BATTLESHIP TURRETS.

All American battleships possessing modern turrets will be equipped with the new electric turning gear. It is

that this need has not been ministered to as is the custom in industrial conditions of this sort. That immigration is the solution of this problem is not to be controverted, but how to secure it is the question now before commercial interests of the great south.

Practically the only influx of the great foreign horde into the south is through Baltimore, whereas there are half a dozen ports along our southern seaboard where not only could there be established a regular line of steamers with a view of supplying immigrants to do the work of the south, but where there would be ample assurance of a return cargo in the enor-



CRESCENT MACHINE CO.'S NEW FACTORY AT LEETONIA.

Mich. Mr. Croze wrote to the company as follows:

"I have received the angle band saw and it took one day to get it ready. It is sawing since without any stop. I cannot understand why I was so slow in getting such a tool for my work. I would not be without it for five times the price."

Evan Owen, Weems, Va., also writes that the machine will make any angle and any degree that is wanted on a boat and that he could not do without it. Other testimonials are quite as emphatic. The company will be pleased to send descriptive data to anyone interested.

IMPROVEMENTS IN WIRELESS TELEGRAPHY.

On the Scandinavian-American liner United States, which arrived from Christiana and Copenhagen, there were conducted a remarkable series of tests of the wireless instrument of the Amalgamated Radio-Telegraph Co., an English concern, in which messages were sent from the harbor of Christiana, in which the ship lay, to Copenhagen, traversing several ranges of lofty mountains.

Hitherto, mountain ranges have

estimated that this will cost about \$5,000 for each ship, and the work will be done principally at the New York and Norfolk yards at the first opportunity. Formerly there was a theory that the most efficient turret was that which could be turned most rapidly, the idea being to fix the gun upon the target with the least loss of time. This has all been changed now, and the theory is to operate the turret so that it may be turned and the guns trained with the greatest precision of movement and delicacy of aim. This has been accomplished to such a successful degree that the turret may be turned in a way which is not perceptible to the eye. The minimum rate will equal one revolution of the turret in thirty hours. This is considered sufficiently slow to permit the gun to be held on a target which is moving slowly at a great distance. The movement is considered most advantageous in all respects, and is accepted as increasing the efficiency of turret operation.

IMMIGRATION AND THE SOUTH.

That the southern states are suffering from a shortage of labor is not only well known but the continual cry arising from that section evidences

mous exportation of the products of the southern cotton industry and other merchandise.

With the establishment of regular lines of steamers from our southern ports would come the direct influx of the labor so much needed in the industrial development of this section and it is thought that an absorption of two millions of foreigners in the next five years would not be out of proportion to the needs of this section.

The report that the new turbine steamers Yale and Harvard, of the Consolidated Steamship lines, which are nearing completion, would be used in the Norfolk service instead of in the fast outside service to Boston, has been authoritatively denied by the Morse interests. As a matter of fact the steamers will not be completed until October and then will inaugurate the 15-hour schedule between New York and Boston.

The submarine Octopus broke a bracket on her port engine recently as she was about to undergo an official test at Newport, and was obliged to postpone the test until the repair could be made.